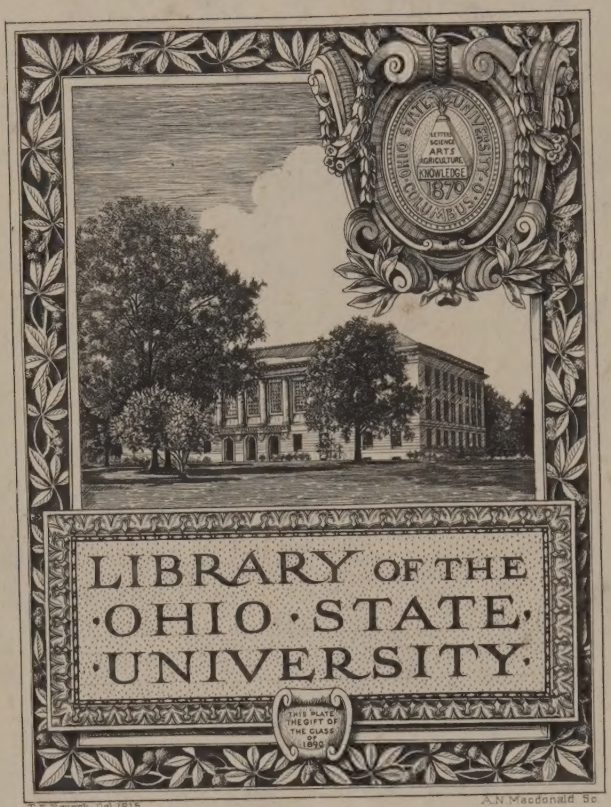

T. E. French Del 1915. A. N. Macdonald Sc

A PRESERVATION NOTE
TO THE READER

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UNIVERSITY BULLETINS. SERIES 5, NUMBER 1.

Thirtieth Annual Report

OF THE

BOARD OF TRUSTEES

OF THE

OHIO STATE UNIVERSITY

TO THE

GOVERNOR OF OHIO

FOR THE

Year Ending June 30, 1900.

PARTS I-II.

Entered at the Columbus Postoffice as Second-class Matter.

OHIO STATE UNIVERSITY

COLUMBUS:
Published by the University
1900

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OHIO STATE
UNIVERSITY

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1899-1900

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LUCIUS B. WING	Newark	" 1902
THOMAS J. GODFREY	Celina	" 1903
J. McLAIN SMITH	Dayton	" 1904
PAUL JONES	Columbus	" 1905
OSCAR T. CORSON	Columbus	" 1906
DAVID M. MASSIE	Chillicothe	" 1907

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FACULTY AND COURSES OF STUDY.

THOMAS J. GODFREY JOHN T. MACK OSCAR T. CORSON

204237

MEMBERS OF THE FACULTIES, AND OTHER INSTRUCTORS

1899–1900

WILLIAM OXLEY THOMPSON,
President — University Grounds.

EDWARD ORTON,*
Professor of Geology and State Geologist — 100 Twentieth street.

WILLIAM HENRY SCOTT,
Professor of Philosophy — 131 Fifteenth avenue.

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Emeritus Professor of Mechanical Engineering — 1353 Highland street.

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SAMUEL CARROLL DERBY,
Professor of Latin — 93 Fifteenth avenue.

WILLIAM RANE LAZENBY,
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JOSIAH RENICK SMITH,
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Professor of Agricultural Chemistry — 1342 Forsythe avenue.

BENJAMIN FRANKLIN THOMAS,
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GEORGE WELLS KNIGHT,
Professor of American History and Political Science, and of Constitutional Law — University Grounds.

ROSSER DANIEL BOHANNAN,
Professor of Mathematics — Sixteenth and Indianola avenues.

C. NEWTON BROWN,
Professor of Civil Engineering — 1343 Forsythe avenue.

ERNST AUGUST EGGERS,
Professor of Germanic Languages and Literatures — University Grounds.

ALBERT MARTIN BLEILE,
Professor of Anatomy and Physiology — 218 King avenue.

WILLIAM ASHBROOK KELLERMAN,
Professor of Botany — 175 Eleventh avenue.

THOMAS FORSYTH HUNT,
Professor of Agriculture, and Dean of the College of Agriculture and Domestic Science — 188 West Tenth avenue.

GEORGE BEECHER KAUFFMAN,
Professor of Pharmacy, and Dean of the College of Pharmacy — University Grounds.

BENJAMIN LESTER BOWEN,
Professor of Romance Languages and Literatures — 46 Jefferson avenue.

JOSEPH VILLIERS DENNEY,
Professor of Rhetoric and the English Language, and Secretary of the University Faculty — 230 West Tenth avenue.

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* Died October 16, 1899.

ALLEN CAMPBELL BARROWS,
Professor of English Literature and Dean of the College of Arts, Philosophy and Science — 85 West Tenth avenue.

EDWARD ORTON, JR.,
Director of the the Department of Clay Working and Ceramics — The Normandie.

WILLIAM FOREST HUNTER,
Dean of the College of Law; Professor of the Law of Sales, Bailments, Evidence, Wills, Construction of Contracts, Law of Corporations; Judge of Moot Courts — 1302 Bryden Road; 18 Board of Trade.

DAVID FRANKLIN PUGH,
Professor of Equity Jurisprudence and Law of Real Property — 1320 Highland street.

JAMES HENRY COLLINS,
Lecturer on Federal Practice — 57 Lexington avenue; Ruggery Building.

EMILIUS OVIATT RANDALL,
Professor of Commercial Law — 1025 Oak street; Supreme Court Room.

WILLIAM THOMAS MAGRUDER,
Professor of Mechanical Engineering — 191 King avenue.

J. P. GORDY,
Professor of Pedagogy — 350 West Seventh avenue.

EDGAR BENTON KINKEAD,
Professor of the Law of Pleading and Practice, Torts, and of Criminal Law — Wyandotte avenue; Board of Trade.

WILLIAM HERBERT PAGE,
Professor of Elementary Law — 527 East Broad street; 27 Board of Trade.

WM. McPHERSON, JR.,
Professor of Chemistry — 97 Hamilton avenue.

JOSEPH NELSON BRADFORD,
Professor of Drawing — 54 West Tenth avenue.

DAVID STUART WHITE,
Professor of Veterinary Medicine, and Dean of the College of Veterinary Medicine — West Fifth avenue.

HERBERT OSBORN,
Professor of Zoology and Entomology — 485 King avenue.

CLARENCE P. LINHART,
Professor of Physical Education, and Director of the Gymnasium — The Vendome.

JAMES MADISON BURNS, U. S. A.,
Professor of Military Science and Tactics — The Columbus Club.

OLIVE BRANCHE JONES,
Librarian — 53 Eleventh avenue.

HENRY CURWIN LORD,
Dircetor of the Emerson McMillen Observatory and Associate Professor of Astronomy — Observatory Park.

FRANK EDWIN SANBORN,
Director of the Department of Industrial Arts — 380 West Eighth avenue.

FRANK ARNOLD RAY,
Associate Professor of Mine Engineering — 137 King avenue.

EMBURY ASBURY HITCHCOCK,
Associate Professor of Experimental Engineering — 380 West Eighth avenue.

FRANCIS CARY CALDWELL,
Associate Professor of Electrical Engineering — 401 Sixth avenue.

PERLA G. BOWMAN,
Associate Professor of Domestic Science — The Saint Anna.

FREDERICK CONVERSE CLARK,
Associate Professor of Economics and Sociology — 1634 Neil avenue.

WILBUR HENRY SIEBERT,
Associate Professor of History — 1332 Highland street.

WILLIAM DAVID GIBBS,
Associate Professor of Agriculture — 234 West Tenth avenue.

STELLA ELLIOTT CANFIELD,
Associate Professor of Physical Education — 1457 Worthington street.

GEORGE WASHINGTON McCOARD,
Associate Professor of Mathematics — 325 West Sixth avenue.

CHARLES WALTER MESLOH,
Associate Professor of German — University Grounds.

ARTHUR WINFRED HODGMAN,
Associate Professor of Classic Languages — 164 West Ninth avenue.

CHARLES SMITH PROSSER,
Associate Professor of Historical Geology — 1362 Highland street.

JOHN ADAMS BOWNOCKER,
Associate Professor of Inorganic Geology — 1594 Neil avenue.

JOHN WRIGHT DECKER,
Associate Professor of Dairying — 329 West Eighth avenue.

JOHN A. SHAUCK,
Lecturer on Supreme Court Practice, Special Cases, etc. — 95 Winner avenue.

J. WARREN SMITH,
Lecturer on Meteorology — 55 Cleveland avenue.

JAMES ELLSWORTH BOYD,
Assistant Professor of Physics — 25 Maynard avenue.

JOSEPH RUSSELL TAYLOR,
Assistant Professor of Rhetoric — corner King and Worthington.

CHRISTOPHER ELIAS SHERMAN,
Assistant Professor of Civil Engineering — 772 Oak street.

WILLIAM LUCIUS GRAVES,
Assistant Professor of Rhetoric — 1313 Forsythe avenue.

CLAIR ALBERT DYE,*
Assistant Professor of Pharmacy — 169 King avenue.

THOMAS EWING FRENCH,
Assistant Professor of Drawing — 1458 Worthington.

CHARLES WILLIAM FOULK,*
Assistant Professor of General Chemistry — 41 Eleventh avenue.

CHARLES LINCOLN ARNOLD,
Assistant Professor of Mathematics — 328 West Eighth avenue.

CHARLES A. BRUCE,
Assistant Professor of French — 234 West Tenth avenue.

JOHN H. SCHAFFNER,
Assistant Professor of Botany — 40 West Tenth avenue.

WILLIAM FINLEY LAVERY,
Assistant Professor of Veterinary Medicine — 1700 Neil avenue.

CHARLES BYRON FREDERICK,
Assistant Professor of Veterinary Medicine — Veterinary Hospital.

CORNELIA PORTER SOUTHER,
Assistant Professor of Domestic Art — 1356 Neil avenue.

CHARLES BRADFIELD MORREY,
Assistant Professor of Anatomy and Physiology — 86 King avenue.

WILLIAM EDWARDS HENDERSON,
Assistant Professor of Analytical Chemistry — 41 West Eleventh avenue.

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* Absent on leave.
^ Resigned September 21, 1900.

JAMES STEWART HINE,
Assistant Professor of Entomology — 26 West Fourth avenue.

KARL DALE SWARTZEL,
Assistant Professor of Mathematics — 57 West Eighth avenue.

GEORGE H. McKNIGHT,
Assistant Professor of Rhetoric and English Language — 312 West Seventh avenue.

HERRICK CLEVELAND ALLEN,
Assistant Professor of Public Speaking — 275 East Gay street.

BURT BIDWELL HERRICK,
Instructor in Cheese-making — 167 Tenth avenue.

FREDERICK EDWARD KESTER,
Instructor in Physics — 1473 Neil avenue.

WILLIAM ABNER KNIGHT,
Assistant in the Industrial Department and Foreman of the Machine Shops — 206 West Lane avenue.

THOMAS KENYON LEWIS,
Assistant in Drawing — 1293 Dennison avenue.

FRANCIS LEROY LANDACRE,
Assistant in Zoology and Entomology — 1332 Highland street.

HARRIET TOWNSHEND,
Assistant in Library — 53 West Eleventh avenue.

MAUDE DOROTHY JEFFREY,
Assistant in Library — 65 West Eleventh avenue.

ALBERT EARL VINSON,
Assistant in Agricultural Chemistry — 134 West Ninth.

GERTRUDE STOWELL KELLICOTT,
Assistant in Library — 1332 Highland street.

CLARK WISSLER,*
Assistant in Philosophy and Pedagogy — 1355 North High street.

EDWARD EVERETT SOMERMEIER,
Assistant in Metallurgy and Meteorology — 1590 Neil avenue.

FRANK RUHLEN,
Assistant in Agriculture — North Dormitory

LUCY ALLEN,
Assistant in Library — 1490 Neil avenue.

DON CARLOS HUDDLESON,
Assistant in Gymnasium — 249 West Lane avenue.

JOSEPH HENRY VOSSKUEHLER,
Assistant in Drawing — 201 West Eleventh avenue.

CLAUDE B. GUITTARD,
Assistant in Library — 80 McMillen avenue.

ALBERT V. BLEININGER,
Assistant in Ceramics — North Dormitory.

OLIVER V. BRUMLEY,
Assistant in Veterinary Medicine — University Grounds.

SILAS MARTIN,
Assistant in Drawing — 1269 Dennison avenue.

JOHN B. SANBORN,
Assistant in American History — 215 West Tenth avenue.

FRED ALAN FISH,
Assistant in Electrical Engineering — 239 West Eleventh avenue.

HOMER CHARLES PRICE,
Assistant in Horticulture and Forestry — 1594 Neil avenue.

* Resigned September 21, 1900.

WALTER ALEXANDER LANDACRE,
Assistant in Pharmacy — 1574 Summit street.

WILLIAM HENRY RENCK,
Assistant in Industrial Arts and Foreman of the Carpenter and Pattern Shops — 910 West Rich street.

CHARLES PHILIP CROWE,
Assistant in Industrial Arts and Forge Master — 971 Highland street.

FRANCIS MARION HAMILTON,
Assistant in Philosophy and Education — 1355 North High street.

JOHN WESLEY GROVES,
Assistant in Civil Engineering — 38 West Eighth avenue.

DELBERT ALONZO CROWNER,
Assistant in Butter-making — North Dormitory.

ELISHA SMITH,
Assistant in Cheese-making.

MELVIN DRESBACH,
Fellow in Anatomy and Physiology — 236 West Eighth avenue.

FRANK ORVILLE CLEMENTS,*
Fellow and Laboratory Assistant in Chemistry — 252 West Eighth avenue.

FREDERICK J. HALE,
Fellow and Laboratory Assistant in Mechanical Engineering — 239 West Tenth avenue.

EMMA LEANNA BALL,
Fellow and Assistant in Mathematics — 225 King avenue.

JOHN BERNARD PARKER,
Fellow and Theme Assistant in Rhetoric — 43 West Woodruff avenue.

ALBERT HEBER McINTYRE,
Fellow in Industrial Arts — 240 West Eighth avenue.

DONALD ALEXIS KOHR,
Fellow, and Laboratory Assistant in Chemistry — 1590 Neil avenue.

JOHN WESLEY YOUNG,
Fellow, and Assistant in Mathematics — 883 East Main street.

HAROLD WARNER BROWN,
Fellow, and Assistant in Physics — 242 King avenue.

HERBERT W. KENNEDY,
Emerson McMillin Fellow in Astronomy — 164 West Ninth avenue.

SAMUEL WILLIAMSON COLLETT,
Fellow in Botany — 48 West Woodruff avenue.

HERBERT CHARLES GORE,
Fellow and Laboratory Assistant in Chemistry — 185 West Ninth avenue.

CHARLES ARTEMUS GRATE,
Fellow and Laboratory Assistant in Mechanical Engineering — 1610 Highland street.

GRACE L. PITTS,
Fellow in Economics — 309 East Gay street.

ALICE DUFOUR,
Fellow and Assistant in Botany — 374 Oak street.

WILBER E. MANN,
Emerson McMillin Fellow in Economics — 1340 Hunter street.

WILLIAM C. MILLS,
Curator of Archaeology — 91 West Frambes avenue.

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* Resigned January 23, 1900.

EXECUTIVE DEPARTMENT

1899-1900

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ALEXIS COPE.....Secretary Board of Trustees and Bursar
W. C. McCRACKEN.....Chief Engineer
KATHERINE H. DUNCAN.....Executive Clerk
EDITH D. COCKINS.....Registrar
EDITH R. HUBLER.....Telephone Exchange
CARL E. STEEB.....Accountant
CHARLES LOW.....First Assistant Engineer
WILLIAM STANDLEY.....Second Assistant Engineer
THOMAS BOUDE.....First Fireman
W. E. CASE.....Second Fireman
JAMES KELLEY.....Lawnkeeper

JANITORS

ARTHUR CHANTLER.....University Hall
HENRY CHANTLER.....Orton Hall
GEO. W. GOODSPEED.....Chemical Hall
JOHN H. BROWN.....Hayes Hall
GEO. DENNY.....Horticultural Hall and Veterinary Hospital
D. D. GEREN.....Gymnasium
WILLIAM WHITESTINE.....Biological Hall
M. N. COOK.....Townshend Hall

STATE GEOLOGIST.

(1) PROFESSOR EDWARD ORTON.

STATE SEALER OF WEIGTHS AND MEASURES.

THE PROFESSOR OF PHYSICS, *Ex-Officio.*

(1) Died October 16, 1899, and was succeeded by Professor Edward Orton, Jr.

COLUMBUS, O., June 30, 1900.

His Excellency, HON. GEO. K. NASH, Governor of Ohio:

DEAR SIR: I have the honor to transmit herewith the thirtieth annual report of the Board of Trustees, Ohio State University.

Very respectfully,

Your obedient servant,

ALEXIS COPE, *Secretary.*

REPORT OF THE BOARD OF TRUSTEES.

OFFICE OF THE BOARD OF TRUSTEES,
OHIO STATE UNIVERSITY,
COLUMBUS, O., *June* 30, 1900.

HON. GEORGE K. NASH, *Governor of Ohio.*

SIR:—In compliance with law, the board of trustees respectfully submits the thirtieth annual report of the Ohio State University, it being for the year ending June 30, 1900.

ENDOWMENT.

The part of the irreducible debt of the state which forms the endowment of the university, at the date of the last annual report, June 30, 1899, was $552,617.66, on which the annual interest was $33,157.06.

Under the operations of the act of the general assembly of March 14, 1889, entitled "an act to quiet title to unpatented lands in the Virginia military district of Ohio," the following sums were added thereto: July 7, 1899, $338.00; August 8, 1899, $130.22; September 11, 1899, $80.00; November 13, 1899, $72.70; January 15, 1900, $428.54; April 18, 1900, $101.00; May 8, 1900, $51.50; June 15, 1900, $74.00; total for the year, $1,275.96; — making the endowment fund June 30, 1900, $553,893.62, on which the annual interest is $33,233.61.

THE WILLIAM J. BRYAN PRIZE.

It will be remembered that in April, 1898, the Honorable William J. Bryan, in a letter addressed to the president of the university proposed "to give to the university, if agreeable to the trustees, $250, the same to be invested and the proceeds used as a prize for the best essay discussing the principles which underlie our form of government."

The board of trustees promptly expressed its willingness to receive such gift and Mr. Bryan a few weeks later forwarded a draft for the amount.

On July 20, 1898, pursuant to the provisions of section 4105-15 of the revised statutes of Ohio said sum was certified into the state treasury and became a part of the irreducible debt of the state, bearing interest at the rate of six percent per annum payable semi-annually.

There were no competitors for the prize until June 30, 1900, when the accumulated interest added to the principal sum made the endowment $282.50, and the interest thereon, $16.95.

The interest thus accumulated was awarded on competition to Mr. Charles W. Gayman, of the class of 1900, in accordance with the terms of the gift, — he having submitted the best essay on the principles underlying our form of government.

RECEIPTS AND DISBURSEMENTS.

The following are the receipts and disbursements for the year ending June 30, 1900:

RECEIPTS.

Balance in treasury June 30, 1899	$9,088 04	
Interest on endowment	33,204 22	
State levy	166,076 15	
Sale of refunding bonds	43,611 00	
Appropriation act of congress, 1890	25,000 00	
Rents	1,111 00	
Virginia military lands	30 00	
Student fees	31,920 75	
Sale store room cards	2,954 04	
Sale store room supplies	459 62	
Emerson McMillin fellowships	190 00	
N. B. M. A. scholarship in ceramics	250 00	
Diploma fees	735 00	
American Association for the Advancement of Science (unused appropriation returned)	188 51	
Sale of Buckeye engine	450 00	
Interest on W. J. Bryan prize	8 15	
Sale of supplies, ceramics department	50 00	
From commencement luncheon	59 00	
Miscellaneous receipts	232 32	
		$315,617 80

DISBURSEMENTS.

Salaries	$153,197 84
Expenses of trustees	387 87
Repairs	10,680 34
Fuel	6,705 60
Gas	1,448 14
Library	5,974 18
Printing and advertising	2,858 12
Special bulletins	1,362 00
Virginia Military Lands	5,059 16
Roads and grounds	1,240 43
Water rates	1,219 77
Bonds and interest	81,313 20
Repairs and extensions, heat, power and light plant	4,682 53
Residence for astronomer	2,585 06
Apparatus	9,558 99
Laboratory supplies	10,320 45
Tools and machinery	1,756 73
Arc lamps	200 00
Orton memorial	121 25
Furniture, cases and shelving	962 29
Lockers	375 00

Blank books and stationery	437 26	
Rent for fire alarm and watchman boxes	112 00	
Postage	399 90	
Commencement expenses	565 45	
Installing experimental boiler	1,093 10	
Agricultural students' union	119 10	
Oils	201 22	
Telephone service	365 27	
Telegrams	40 58	
Messenger service	468 90	
Extra clerical services	103 90	
General supplies, cleaning materials, etc	434 66	
Freight and cartage	666 73	
Examination paper	221 90	
Live stock	182 00	
Feed	300 29	
Seeds and plants	132 26	
Miscellaneous	637 87	
		$308,491 34
Balance in hands of treasurer June 30, 1900		$7,126 46

In the treasurer's report filed herewith said receipts and disbursements are set forth in fuller detail.

THE VIRGINIA MILITARY LANDS.

To June 30, 1899, the total receipts from sales of the Virginia military lands, granted to the university by the act of the general assembly of March 26, 1872, were	$65,395 28	
The receipts from this source during the year ending June 30, 1900, were	30 00	
		$65,425 28
The expenses incident to the survey and disposition of said lands to June 30, 1899, were	23,999 09	
Such expenses for the year ending June 30, 1900 (including $5,000 paid in settlement of pending suits hereafter mentioned) were	5,059 46	
		29,058 55
Leaving net cash receipts to June 30, 1900		$36,366 73
Of this sum on June 30, 1899, there had been paid into the state treasury to the credit of the endowment fund	13,665 14	
And expended for building and maintaining residences for the professors under act of April 17, 1882	20,052 51	
During the year ending June 30, 1900, there was expended for a residence for the director of the Emerson McMillin Observatory	2,585 06	
		36,302 71
Leaving balance June 30, 1900		$64 02

The receipts and disbursements of this fund for the year ending June 30, 1900, are included in the preceding general account of the aggregate receipts and disbursements.

ADDITIONS TO ENDOWMENT.

For the period ending June 30, 1899, the additions to the endowment under the operations of an act of the general assembly of March 14, 1889, entitled "an act to quiet title to unpatented lands in the Virginia military district of Ohio," the act of April 21, 1893, entitled "an act for the relief of certain persons who formerly held lands in the Virginia military district of Ohio," an act amendatory of said last mentioned act passed May 21, 1894, and an act passed April 26, 1898, entitled "an act making appropriations for the relief of certain persons who formerly held lands in the Virginia military district of Ohio," were $14,776.22.

During the year ending June 30, 1900, under the operations of said first mentioned act, there was added to the said endowment the sum of $1,275.96: making total additions to the endowment under said acts $16,052.18.

THE KENDRICK SUITS.

The suits mentioned in former reports which grew out of a contract made with the late Mr. Sam Kendrick in 1882, for the discovery of undiscovered lands in the Virginia military district of Ohio, have been finally settled and compromised by the payment to the plaintiffs of the sum of $5,000 inclusive of the costs.

As this important and expensive litigation is now closed a brief resumé of the facts which led to it is presented. In 1882, while the board of trustees, through its agents, was endeavoring to ascertain and dispose of the Virginia military lands granted to the university by act of the general assembly of March 26, 1872, Mr. Sam Kendrick of Chillicothe, at that time principal surveyor of said lands, represented to the board that he had in his possession the only complete records of said lands and was able to point out numerous tracts which the agents of the board had failed to discover and which would yield a handsome addition to the funds of the university. After full consideration of these representations, the board, in August 31, 1882, employed said Kendrick "to discover, survey, plat, cause to be appraised, and sell undiscovered lands in the Virginia military district, belonging to the Ohio State University," * * * "the sales and the conduct of all litigations and negotiations concerning the same to be reported to the executive committee of the board and by said committee approved before the same shall be binding upon either party. After said approval, all expenses of surveying, appraising or litigating, and other necessary expenses incurred, save and except the time given by said Kendrick, to be paid out of such funds as may arise from each tract of said lands by sale or compromise, and the residue of each tract to be divided as follows: to the Ohio state university 66 2/3 per centum and to said Kendrick 33 1/3 per centum." It was provided in said contract of employment that * * * "Undiscovered lands shall be held to include all of said Virginia military lands reported by said Kendrick, and not known to the board or any of its former or present

agents." And that "the said Kendrick is hereby fully authorized to compromise and settle any case or cases with the approval of the executive committee, this authority to terminate on the 10th day of November, 1883."

Provision was made in the contract for the payment of the moneys received, and the making of proper conveyances, and it was also further provided, "that the said Kendrick is to be entitled to the said 33 1/3 percentum of all cases reported by him and approved by said committee, and not finally settled at the date fixed for the determination of this authority.

Mr. Kendrick accepted such employment on the day aforesaid, August 31, 1882, and on the 14th day of November, 1882, reported to the executive committee the discovery of 38 tracts of land and was authorized by the committee "to investigate the titles of said several tracts."

Mr. Kendrick continued from time to time to report additional discoveries until November 14, 1883, when the number had reached 50. On that day, after hearing a verbal report of his transactions concerning said lands, the board passed a resolution declaring that as his contract by the terms thereof ceased on November 18, 1883, it was the opinion of the board that it should not be renewed or extended and directing him "to close up the business reported by him by the second Tuesday of November, 1884.

While engaged in closing up the discoveries already reported Mr. Kendrick from time to time reported other discoveries and the reports were received and filed. In some cases he was authorized to settle and compromise cases of discoveries reported after the date on which the contract was formally terminated, and after the time fixed by resolution for closing up the business.

In 1884, in the case of Fussell v. Gregg the supreme court of the United States decided, or seemed to decide, that in all cases of lands in the Virginia military district of Ohio, where the survey was made prior to January 1, 1852, and was not filed in the general land office in Washington, until after that date, the proceedings were void, the lands remained unappropriated and passed by the act of cession to the state of Ohio, and by act of the general assembly to the Ohio state university.

Stimulated by this decision Mr. Kendrick began to report these lands to the board as discoveries. The case of Coan v. Flagg, decided by the supreme court of the United States in 1887, confirming the opinion of the same court in the case of Fussell v. Gregg still further stimulated the activity of Mr. Kendrick in reporting the unpatented surveys as discoveries until the alleged discoveries reported by him reached the number of 238.

These decisions and the widely asserted claims of Mr. Kendrick spread consternation among the occupants of these surveys throughout the Virginia military district.

Many of them had been occupied and improved by their then owners and those under whom they claimed title for periods varying from twenty

to eighty years. They had built their homesteads and had paid taxes upon them and had exercised all the privileges of ownership, all this time, in the belief that their titles were secure. When informed that their titles were absolutely void and that their lands belonged to some one else their feelings can better be imagined than described.

They applied to the general assembly for relief, and on March 14, 1889, an act was passed providing for quieting the titles to these lands. The act provided that on its acceptance by the board of trustees, the occupants of such surveys might, on payment of two dollars and on proof that they or those under whom they claimed had occupied and improved the lands for more than twenty-one years, demand of the board deeds quieting their titles, and thereupon the auditor of state was required to add to the endowment fund of the university one dollar for each acre of land so conveyed. On the 20th day of June, 1889, after full discussion and careful deliberation, the board formally accepted the provisions of said act.

Before such acceptance, an effort was made to effect a settlement with Mr. Kendrick, but his demands were so extravagant that no agreement was possible. After such acceptance, on the 16th day of November, 1889 ,he filed a suit against the board of trustees in the court of common pleas of Franklin county, setting forth the contract before referred to, the filing of the aforementioned discoveries and asking judgment for the sum of $133,333.33, with interest from March 14, 1889.

A few months later Mr. N. W. Evans, of Portsmouth, who had been acting as Mr. Kendrick's attorney, also filed a suit in the same court against the board of trustees claiming $5,000 for legal services rendered in connection with these reported discoveries.

With the advice and consent of the attorney general, Messrs. Harrison, Olds & Henderson were employed to defend these suits.

The preparation for their defence involved a vast amount of labor on the part of the board and its attorneys, requiring a patient and careful examination of the Virginia military land records both in Ohio and in the general land office in Washington. The evans case was tried in January, 1898, and was decided in the court of common pleas in favor of the university, but was carried on error to the circuit court. Two weeks were occupied in its trial. The immense labor involved in the trial of the Kendrick case, which was really two hundred suits in one, — each alleged discovery having its separate and distinct history and the claim therefor depending upon the separate and distinct facts connected therewith, — made the board of trustees very willing to compromise on reasonable terms. When, therefore, a proposition from the plaintiff was made to settle the case for a sum not greater, probably, than it would cost to try it, the proposition was accepted and by agreement the case was settled and dismissed by payment to the plaintiff of the sum of $4,000 including costs of suit.

As the two cases grew out of the same transaction, the case of N. W. Evans against the board of trustees was at the same time settled and compromised for the sum of $1,000, out of which the costs in the suit, amounting to $246.96, were paid by the board of trustees.

NEW MORRILL FUND.

The following statement shows the receipts and disbursements for the year ending June 30, 1900, of appropriations made by act of congress, approved August 30, 1890, and known as the "New Morrill Fund," and which are included in the preceding statement of the aggregate receipts and disbursements for that period.

RECEIPTS.

Balance in treasury June 30, 1899	$37 31	
Appropriations for year ending June 30, 1899	25,000 00	
		$25,037 31

DISBURSEMENTS.

For instruction and facilities in agriculture	$4,341 61	
For instruction and facilities in mechanic arts	8,178 19	
For instruction and facilities in English language	1,258 99	
For instruction and facilities in mathematical science	2,072 82	
For instruction and facilities in natural and physical science	7,860 40	
For instruction and facilities in economic science	1,126 99	
		24,839 00
Balance in treasury June 30, 1900		$198 31

The law of congress making the appropriation requires a detailed annual report of the receipts and disbursements of this fund, which report for the year ending June 30, 1900, is appended to the treasurer's report filed herewith.

It will be seen by the foregoing statement that the appropriation of the general government which begun at $15,000 a year and was to be increased annually by $1,000 until the amount was $25,000 and then continued at that sum, has reached its highest limit.

This annuity was, by the act of 1890, which created it, made payable out of the proceeds of the public lands.

In the 55th congress its continuance was threatened by a bill popularly called the "free homes bill", which gave to settlers on the agricultural public lands which had been acquired by treaty or agreement from the various Indian tribes, patents for their lands "upon payment to the local land officers of the usual and customary fees and no other or further charge of any kind whatsoever."

This bill in the opinion of the commissioner of the general land office would give to such settlers about $35,000,000 of the anticipated receipts from sales of the public lands and would virtually wipe out this source of national revenue. The bill passed the senate and was favorably

reported by a committee of the house, when the executive committee of the American land grant college association, on which the university is represented, met in Washington and organized an opposition to its passage. The opposition was ably led by General C. H. Grosvenor, and was successful in defeating the measure.

At the late session of the 56th congress the bill was again introduced into and passed the senate, but in the house, to allay the opposition of the land grant colleges, the author of the bill accepted an amendment prepared by the executive committee of the land grant college association, providing: "That in the event that the proceeds of the annual sales of the public lands shall not be sufficient to meet the payments heretofore provided by an act of congress approved August 30, 1890, for the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts, established under the provisions of an act of congress approved July 2, 1862, such deficiencies shall be paid by the United States."

The bill passed the house with this amendment, the amendment was concurred in by the senate, and as so amended the bill became a law, thus putting at rest all fears for the permanence of the Morrill annuity.

SCHOOLS OF MINES

At the late session of congress a number of bills were introduced looking toward a congressional appropriation in aid of schools of mines in the several states and territories.

The executive committee of the land grant college association, watchful of the interests of the institutions they serve, got together the several bills introduced and prepared a bill modeled after the Morrill Act of 1890, which was introduced into the senate by Senator Tillman of South Carolina, and into the house by General C. H. Grosvenor of Ohio. The bill provides an appropriation of $10,000, increasing the amount $1,000 annually until it reaches $15,000, at which sum it is to continue, "for the establishment and maintenance of schools or departments of mines and mining in connection with colleges for the benefit of agriculture and mechanic arts in accordance with the provisions of an act of congress approved July 2, 1862." * * * "to be expended for geological instruction, mining engineering, metallurgy, research in road-building material and its proper application, and the branches of learning related thereto, including the various branches of physical, natural and economic science and the facilities for such instruction, research and experiment, in order to promote a liberal and practical education and secure the most intelligent use, conservation and development of the mineral resources of the country."

Representatives of the executive committee of the land grant college association appeared before committees on mines and mining of the senate and house and advocated its passage.

The bill passed the senate by a unanimous vote and in the house was referred to the committee on mines and mining, which on May 22, 1900, reported unanimously in its favor.

The president of the university and the representative of the university on the executive committee of the land grant college association, by authority of the board of trustees, went to Washington and took an active part in urging this legislation.

They found an active and earnest sentiment in the house in favor of the measure, and practically no opposition to it. The pressure of other bills in the closing hours of the session prevented its consideration, but assurances were given that at the adjourned session it should have a day fixed for a hearing on its merits. Its friends have little doubt of its final passage at that time.

BONDED INDEBTEDNESS.

The bonded indebtedness of the university June 30, 1899, was $355,000, due and payable as follows: $55,000 December 1, 1899; $10,000 June 1, 1900; $55,000 December 1, 1900; $10,000 June 1, 1901; $55,000 December 1, 1901; $10,000 June 1, 1902; $55,000 December 1, 1902; $10,000 June 1, 1903; $55,000 December 1, 1903; $10,000 June 1, 1904; $15,000 December 1, 1904; $10,000 June 1, 1905; $5,000 December 1, 1905.

Of this indebtedness $60,000 bore interest at six percent and $295,000 at four percent per annum, payable semi-annually.

Twenty-five thousand dollars of said indebtedness falling due December 1, 1899, were paid when due and the bonds taken up and cancelled.

Under and pursuant to the provisions of an act of the general assembly entitled "an act to authorize the trustees of the Ohio state university to refund and extend the time of payment of portions of the bonded indebtedness of said institution as the same becomes due," passed April 23, 1898, $30,000 of the four and one-half percent certificates of indebtedness falling due December 1, 1899, were taken up by an issue of the same amount of four and one-half percent refunding bonds falling due, $10,000 December 1, 1905, and $20,000 December 1, 1906.

Said bonds brought a premium of $2,705. Under the provisions of the same act the $10,000 of six percent certificates of indebtedness falling due June 1, 1900, were also taken up by a further issue of four and one-half percent refunding bonds falling due $5,000 December 1, 1906, and $5,000 December 1, 1907. Said refunding bonds brought a premium of $906. The premiums received in these operations reduces the nominal interest on the four and one-half percent bonds to a little less than three percent.

Said reductions of principal and interest left the bonded indebtedness June 30, 1900, $330,000, of which $50,000 bears interest at six percent and $280,000 at four and one-half percent per annum, payable semi-

annually. Said remaining indebtedness falls due as follows: $55,000 December 1, 1900; $10,000 June 1, 1901; $55,000 December 1, 1901; $10,000 June 1, 1902; $55,000 December 1, 1902; $10,000 June 1, 1903; $55,000 December 1, 1903; $10,000 June 1, 1904; $15,000 December 1, 1904; $10,000 June 1, 1905; $15,000 December 1, 1905; $25,000 December 1, 1906; $5,000 December 1, 1907.

INCREASE OF UNIVERSITY LEVY.

The necessity for additional buildings occasioned by increasing numbers of students had become so urgent that at a meeting of the board of trustees held in November, 1899, a committee composed of the president, the secretary and representatives of the board of trustees and faculty was appointed to present the matter to the incoming legislature.

The crowded condition of the department of physics and the entire lack of rooms in which the students of the college of law could be comfortably accommodated impelled the committee to make a special appeal in their behalf.

Accordingly when the general assembly met in January said committee matured a bill providing appropriations for erecting a law building and a building for the department of physics.

The bill was introduced into the house by the Hon. F. H. Heywood and referred to the finance committee.

In the hearing before the committee the needs of the university were ably presented by President Thompson.

The finance committee, while recognizing the urgent needs of the university, were averse to making any appropriation for the purpose out of the general revenues, but suggested an increase of the university levy. In accordance with such suggestion Mr. Heywood offered as a substitute for his original bill a bill increasing the university levy five one-hundredths of a mill, the increase to be used solely for the erection and equipment of buildings. The substitute was favorably reported by the finance committee, passed both houses with practically no opposition and became a law March 29, 1900.

No part of the funds provided by such levy will be available until about the middle of March, 1901.

The university is under great obligation to the Hon. F. H. Heywood who so ably championed and wisely guided the measure through the house, and to the Hon. E. H. Howard who had charge of it in the senate and secured its passage in that body. They are both graduates of the university and it is gratifying to have their names connected with an act of such importance to their alma mater.

To the other members of the general assembly who aided in this legislation the trustees on behalf of the university and its friends desire to make profound acknowledgment. It will be their ambition to so administer the funds so generously given that not a dollar shall be wasted

or misapplied, but that the whole shall be used in such a manner as to secure the largest returns for the outlay.

It has been decided to erect a law building before a building for the department of physics and as soon as practicable to have the plans, specifications and estimates therefor matured so as to begin work on the building at the earliest practicable moment.

Other buildings are needed besides those provided for as above set forth, as will be seen by the report of the president, to which attention is invited.

ASTRONOMER'S RESIDENCE.

The work in research at the Emerson McMillin Observatory has already arrested the attention of leading astronomers both in this country and in Europe.

Early in the spring Professor Vogel of the Pottsdam Observatory in a review of the work done in the last twenty-five years upon motion in the line of sight, mentioned the work along this line done at Paris. Cambridge, England, the Lick Observatory and the *Emerson McMillin Observatory* as showing the marked progress in this new branch of modern astronomy.

Public mention was made last year of the fact that of the 57 stars whose motion in the line of sight had been determined, five of them had been determined at the Emerson McMillin Observatory by its director, Professor Henry C. Lord.

The work at this observatory has been done under unfavorable conditions because the astronomer had no place of residence near the observatory.

An observatory differs materially from other laboratories in the fact that observations are absolutely dependent on the conditions of the sky. The sky must not only be clear but the building must be opened up and cooled off before observations can begin and it frequently happens that the best nights follow days which are cloudy until late in the evening. With the observer living a mile away many hours of right conditions are lost which would not be the case if the observer lived in close proximity to his work.

These objections apply as well to students at work in the observatory as to the astronomer, for their work must be done under the same conditions. It has happened that the work of an entire evening has been lost because the astronomer lived too far away from the observatory to catch the favoring conditions of a break in the clouds which gave an hour of clear sky.

Recognizing the necessity for a residence near the observatory for the astronomer, where advantage could be taken of every favorable opportunity for observations, on September 21, 1899, President Thompson presented the matter to the board of trustees together with prelim-

inary plans, estimates, etc., for such a residence prepared by Professor Henry C. Lord, director of the Emerson McMillin Observatory.

Said plans, estimates, etc., were referred to the farm committee and action thereon deferred to the November meeting.

At the November meeting the farm committee submitted to the board completed plans, specifications and estimates for such building which were adopted by the board and the secretary was directed to present them to the governor, auditor of state and secretary of state for their approval and if approved by them then to give notice as required by law of the time and place when and where sealed proposals would be received for furnishing the materials and performing the labor necessary for the erection of the building. At the same time the sum of $5,000 of the receipts from sales of the Virginia military lands, as authorized by Section 4105-24 of the revised statutes of Ohio, was appropriated to meet the expenses of such erection. The plans, specifications and estimates were approved by the state officers above mentioned, due notice was given as required by law and on January 23, 1900, the bids were opened and the contract for the erection of the building was awarded to Hugh J. McTeague of Columbus, at his bid of $4,092.

The plans, specifications and estimates were prepared by Professor Henry C. Lord, director of the Emerson McMillin Observatory, and he was appointed architect and superintendent of construction, under the general direction of a building committee consisting of the president and secretary of the university and Professor J. N. Bradford.

At this date, June 30, 1900, the building is well under way and will be completed ready for occupancy by the latter part of August.

The building is loated about 100 feet east of the observatory.

OBSERVATIONS OF THE ECLIPSE.

MAY 28, 1900.

As further evidence of the wide recognition of the excellence of the work done at the Emerson McMillin Observatory Professor S. J. Brown of the naval observatory at Washington in organizing expeditions to observe the eclipse of May 28, 1890, requested Professor Henry C. Lord, director of the Emerson McMillin Observatory, to undertake certain observations at Barnesville, Georgia, using the instruments of the Emerson McMillin Observatory.

To accomplish this work it was necessary to make several delicate attachments to the spectroscope and to construct an elaborate stand to carry the instrument. The attachment to the spectroscope consisted of a movable plate holder so arranged that four photographs two inches long and one-half an inch wide could be taken in rapid succession,—the interval between exposures not being over one-third of a second while the exposures themselves could be made long or short as desired, it being only necessary to press a bulb in order to move the plate from

one position to the next. This plate holder was designed and built by Professor Lord with his own hands in the instrument shop of the observatory, and to it is largely due the success of his observations of the eclipse.

In a letter to the secretary of the board of trustees, Professor Lord gives the following account of his work at Barnesville:

"The spectroscope and appliances were finished, set up and tested, boxed and shipped so that I could leave for Barnesville, Ga., May 9. I reached Barnesville on the evening of May 10, and found Professor Updegraff and the corps of the naval observatory already on the ground.

The work of setting up the instrument was at once begun and the first adjustments were made May 17, eleven days before the day of the eclipse but none too soon. These adjustments were already perfected, the final testing being made upon Arcturus on the night of May 26, when everything was found in readiness for the morning of the 28th.

For nearly a week preceding the eclipse I made daily rehearsals of the programme of observations. To this promptness and thoroughness of adjustment, more than to any other one thing, is due the success of my work. This is shown by the fact that on the night preceding the day of the eclipse I was taken quite sick and was but little better the next morning, but so thorough had been my self-imposed drill that I could not have done better had I been in perfect health."

Professor Lord secured seven spectrum photographs at the time of the eclipse; two showing the spectrum of the flash in the orange, green and blue. These photographs are among the best ever taken of this portion of the spectrum. The plates have not been completely measured and much of the work of the observatory has been interrupted and delayed on account of the duties devolved on the professor as architect and superintendent of the astronomer's residence.

When the building is finished, with the increased amount of time at his disposal, and with his abiding place within 100 feet of the observatory he hopes to rapidly complete the eclipse work and to resume his work on motion in the line of sight, which was interrupted by preparation for observations of the eclipse. All expenses connected with the foregoing observations of the eclipse, including Professor Lord's personal expenses, were generously borne by the U. S. naval observatory.

THE ROBINSON TESTING PLANT.

Among the important acquisitions during the year was the gift by Doctor S. W. Robinson of an experimental boiler and the machinery and appliances necessary for making accurate tests of boilers and fuels under varying conditions.

Doctor Robinson was led to make this donation, as was stated by him in a letter addressed to the board of trustees, by his interest in the tests of boilers and fuels made at the university by Professor Hitchcock,

his former assistant, "by reason of the unusual and high value of the results obtained" "and in the belief that the ability and enthusiasm shown by Professor Hitchcock in this work, would, with the more complete equipment proposed, be able to reach results of hitherto unknown importance."

The gift was made on condition that the trustees should assume the cost of installation, and was gladly accepted.

The original gift included a 107 HP Babcock and Wilcox boiler of wrought steel construction, capable of carrying a working pressure of 200 pounds; a Green's fuel economizer for heating the feed water by means of escaping flue gases; an air heater for heating by means of escaping flue gases the external air supplied to the fire; a forced draft fan for drawing air through the heater and from boiler room and supplying same to the fire and to furnish draft for varying degrees of combustion; and an induced draft fan for producing any practical amount of draft independent of stack or chimney.

Dr. Robinson afterwards added to the gift a steam engine for driving the economizer and the necessary iron work for connecting up the fans. The value of the gift is near $3,000.

The apparatus has been installed at a cost of $885.78 and the boiler has been connected with the general heating system for use in emergencies at a cost of $131.33.

Doctor Robinson served on the committee having charge of the installation, gave every detail careful attention, and rejoices with the university authorities, that the institution has the most complete plant of the kind in existence.

THE CAMPUS.

During the year just ended the sum of $1,240.43 was expended on the campus. A brick walk was laid between University and Orton Halls at a cost of $212.05 and the remainder of said sum was expended in mowing the lawn and caring for the roads, walks and drives.

Provision has been made for the beginning of a botanic garden and a few beds of medicinal and other plants have been set out in that part of the campus south of Botanical Hall. An assistant in the department of botany has been employed whose special work is to look after them and make such additions thereto from time to time as the funds will supply, or that can be obtained by gift or exchange with other botanical gardens. With comparatively small expense it is hoped that the university can soon have a botanic garden worthy of the name.

THE LIBRARY.

The expenditures for the library for the year ending June 30, 1900, exclusive of the salaries of the librarian and assistants were $5,974.18.

Of this sum $427.82 was paid for furniture, cases and shelving;

$96.24 for current supplies; $568.85 for binding; and the remainder, $4,881.27, was expended for books and periodicals.

The report of the librarian shows that the number of accessions during the year was 7,443 and the total number of volumes June 30, 1900, 35,430.

Through the courtesy and interest of Mr. L. C. Ferrel, superintendent of documents, Washington, D. C., about 600 public documents were recently added to the books of the library and 766 valuable reports and documents in the United States embassy at Madrid were secured for the university by payment of the freight thereon.

Many gifts of books from private sources are mentioned in the librarian's report, chief among them a collection valued at $150, illustrative of the influence of the Quakers in American history, especially during the colonial period, presented by Mr. John J. Janney of Columbus, and over $400 worth of books on German history presented by Messrs. John and Louis Siebert of Columbus and which have been added to the library bequeathed by Mr. William Siebert of Illinois, whose bequest was mentioned in a former report. Due acknowledgment of these gifts is made elsewhere in this report.

The librarian again calls attention to the pressing need of a library building, which must be provided at an early day.

With such a building in view she has taken up the comparative study of college and university library buildings and has already visited and inspected at her own expense a number of the leading buildings of the kind in the United States.

The board of trustees hopes that at no distant day means will be provided for the erection of such a building, commensurate with the great nd growing needs of the university.

The demand for additional books is greater than the funds of the university can at present supply and the faculty has by resolution petitioned the board to add to the usual annual appropriation for the library the sum ($1,125) annually saved in interest by reduction of the bonded indebtedness, to be expended solely in the purchase of books.

This petition is still pending before the board.

AMERICAN ASSOCIATION FOR ADVANCEMENT OF SCIENCE.

One of the notable events of the year was the meeting in August, 1899, of the American Association for the Advancement of Science.

The board of trustees united with the board of trade of Columbus, the state historical and archæological society, the Ohio society of mining engineers and other learned societies in extending an invitation to this assocation to hold its annual meeting in Columbus and tendered it the free use of the halls, lecture roome and laboratories of the university, which invitation was promptly accepted.

This great association had recently honored Doctor Edward Orton and honored itself by electing him as its president, and it seemed emi-

nently proper that it should hold its annual meeting at the Ohio State University where he had done so much to advance the cause of science.

The session lasted nearly a week and brought together between three and four hundred workers in science, many of them men of world-wide reputation. The halls, lecture rooms and laboratories of the university were thrown open for these meetings and the faculty, citizens of Columbus, and college men of Ohio outside Columbus vied with each other in paying merited honors to the distinguished visitors. A noonday luncheon was served to the members in the armory at which there was an opportunity for making acquaintances and for exchange of social courtesies which added much to the pleasure of the occasion.

Many important papers were read and discussed, and the interchange of ideas and courtesies between the members of the faculty who were present and the scientific men and women from the leading universities and colleges of the country was profitable and inspiring, and has done much to advertise the university and to increase its reputation in the scientific world. The board of trustees voted the sum of $500 toward the entertainment of the association, but the subscriptions by the board of trade and private citizens of Columbus were so liberal that after all expenses of such entertainment were met the committee returned $188.51 of the appropriation.

NATIONAL GRANGE.

In October, 1899 the national grange held its annual meeting at Springfield, Ohio,—the state grange of Ohio meeting at the same time and place,—and on invitation of the board of trustees these organizations spent a day at the university as the guests of the trustees and faculty. The president of the university delivered a welcome address in the chapel to which responses were made by the officers of the organization, after which the members inspected the various buildings, collections and laboratories and went away duly impressed with the liberal provision made at the university for instruction in the branches related to their calling.

FACULTY.

During the year the university suffered a great loss in the death of Doctor Edward Orton who for many years had so ably filled the chair of gology. Doctor Orton was the first president of the university and during the years of its early struggles was the central force around which all its interests revolved. He stood for the broad and liberal policy which finally prevailed as against that which would have kept it within a narrow field and restricted its sphere of usefulness. The labors of Doctor Orton and of the first faculty of the university who nobly sustained him in his policy are now recalled with gratitude by all the friends of the university. Their unselfish devotion to high ideals in educational work, their patient toil and the influence of their lofty characters are woven into the web and woof of the institution. They shaped its ideals and

gave it an individuality which it is to be hoped it may never entirely lose. In December, 1891, Doctor Orton suffered a stroke of paralysis which partly disabled him, but he continued in active charge of his department until the latter part of May, 1899, when he asked to be relieved of a portion of his work and that his salary be proportionately reduced. Knowing that it was in entire consonance with his real wishes, the board of trustees reluctantly complied with his request.

This action on his part now seems to have been a premonition of the closing scene. He recognized that his physical powers were failing but continued to meet his classes and to haunt the geological museum which had grown up under his wise and careful labors until about the second day of October, 1899, when he took to his room. On the thirteenth day of October, 1899, the check for his salary for the previous month was sent to him and on the same day he wrote acknowledging its receipt, saying, "It seems that I worked up to my natural limit. There has not been a day this term when I was able to lecture. When a man loses appetite and power to sleep he is pretty well gone. That is my condition now." On October 16, 1899, he passed quietly away.

Memorial services in his honor were held in the chapel November 26, 1899, at which Dr. G. K. Guilbert, one of his associates in the U. S. geological survey, Dr. T. C. Mendenhall, president of the Worcester Polytechnic Institute, one of his old associates in the first faculty, Ex-President W. H. Scott and Professor Samuel C. Derby of the present faculty and Hon. T. J. Godfrey of the board of trustees paid eloquent and appropriate tributes to his memory.

These addresses, preceded by a brief biographical sketch prepared by Professor Samuel C. Derby, were printed at the expense of the university, bound in a tasteful brochure and placed in the hands of the president for distribution to the faculty, alumni and friends of the university and to the libraries of other universities and colleges.

Doctor Orton stood unchallenged as the university's highest exemplar of broad scholarship and liberal culture, and for the noblest and best things in character and human activity.

Recognition of his worth was not delayed until after his death, as is frequently the case, but found expression during his life in honors paid to him by his fellow workers in the field of science, and in increasing reverence and respect shown for him by his associates in the faculty, by alumni and students and by his fellow citizens.

The board of trustees in 1892 honored him by naming the building erected for the safe keeping of the geological museum, "Orton Hall."

Now that he is gone it is seen how appropriate and fitting it was that his name should thus be perpetuated. In it are stored the valuable collections he made during the period of his greatest activity.

It was his ambition to write in a book with his own hand a description and history of each one of the more than ten thousand specimens

there deposited, and to mark and number them so that they could be readily identified.

This work was fully completed at the time of his death, — the last entries therein having been made October 2, 1899, the day of his last appearance at the university. This book is deposited in the museum and is a priceless memorial of his patient, untiring labors in the field of science.

The building and what it contains are therefore his fitting monument and will speak for him, we trust, as long as the university endures.

Since Doctor Orton's death the work of the department of geology has been carried on by Mr. Charles S. Prosser, associate professor of historical geology and Mr. John A. Bownocker, associate professor of inorganic geology and curator of the museum.

In November, 1899, in recognition of his former services to the university the name of Doctor Stillman W. Robinson was restored to the faculty roll as *emeritus* professor of mechanical engineering.

In June, 1878, Doctor Robinson was called to the chair of physics and mechanics vice Doctor T. C. Mendenhall who had resigned to accept a professorship in the imperial university of Japan.

In June, 1881, Doctor Mendenhall returned to the university as professor of physics and Doctor Robinson was placed in charge, as professor, of a newly created department of mechanics, the name of the department being subsequently changed to that of mechanical engineering.

Doctor Robinson continued in active charge of this department until the latter part of 1895 when he was compelled to give up work on account of failing health, was granted a leave of absence and shortly afterwards resigned.

Since his resignation he has lived near the university and though occupied with many business cares has kept in touch with the university life and retained his interest in its affairs.

His restoration as a member of the university faculty was warmly welcomed by his former associates in the faculty and by the alumni and students who had profited by his instruction.

While the position to which Doctor Robinson has been elected is purely honorary, requiring no special professional work, the counsel freely given of one so eminent in his profession cannot be otherwise than inspiring and helpful to the university.

At the same time Doctor Sidney A. Norton, in similar recognition of his services as the first professor of chemistry, was elected *emeritus* professor of general chemistry, said election to involve no change in his present duties, that of lecturer in general chemistry.

Other less notable changes in the faculty are mentioned in the report of the president, and in the annual catalogue for the year ending June 30, 1900, which are filed herewith and made a part of this report.

The number of professors in the academic faculty is 30; directors of departments, 3; associate professors, 14; assistant professors, 19; lecturers, 1; fellows and laboratory assistants, 16; librarians, 1; instructors, 2; assistants, 27; curators, 1.

The law faculty consists of the dean, 5 professors and 2 lecturers.

The position and compensation of members of the faculties and other employees of the university are stated elsewhere in this report.

DEGREES.

At the commencement in June, 1900, on the recommendation of the faculty, the following degrees were conferred:

MASTER OF ARTS.

Lucy Allen, B. A., Columbus, O.; William Edward Bohn, B. A., (German Wallace College), Olmsted Falls, O.; Paul Revere Good, B. A., Westerville, O.; Anna Brewster Hirst, B. A., (Antioch College) Yellow Springs, O.; Wilbur E. Mann, B. Ph., Columbus, O.; John Bernard Parker, B. A., Danville, O.; Zella Vina Robinson, B. Ph., Columbus, O.; Herbert Oswald Williams, B. A., Columbus, O.

MASTER OF SCIENCE.

Frederick James Hale, M. E., Columbus, O.; Washington J. Machwart, B. S., (Muskingum College) Mt. Eaton, O.; Raymond Carroll Osborn, B. Sc., Fargo, N. Dakota.

BACHELOR OF SCIENCE

(In Agriculture)

Vernon Hayes Davis, Byesville, O.; Elmer Otterbein Fippin, Briggsdale, O.; Merritt Findlay Miller, Ridpath, O.; Charles Napoleon Mooney, Milan, O.; Arthur Gillett McCall, McGaw, O.; Charles Benjamin Steward, Marcy, O.; Frederick Wellington Taylor, Wooster, O.

BACHELOR OF SCIENCE

(In Horticulture and Forestry)

Frederick Jared Tyler, Perry, O.

BACHELOR OF SCIENCE

(In Domestic Science)

Laura A. Weisman, Columbus, O.

BACHELOR OF ARTS.

Eliza Daugherty Barcus, Columbus, O.; Homer Zurmehly Bostwick, Columbus, O.; J. Loring Courtright, Circleville, O.; George William Stimson, Columbus, O.; John Hervey Eagleson, Columbus, O.; Joseph Pentecost Eagleson, Columbus, O.; Arthur Byron Harward, Columbus, O.; George Melville Karshner, Columbus, O.; William Watts Parmenter, Mt. Vernon, O.; Mary Washington Rice, Columbus, O.; Charles Boyd Sayre, Columbus, O.; Fred Lant

Travis, Pana, Ill.; John Francis Travis, Green Camp, O.; Earle Downs West, Columbus, O.

BACHELOR OF PHILOSOPHY

(Latin Course)

Ida May Fisher, Columbus, O.; Anna Faye Howard, Columbus, O.; Richard Thomas Jones, Columbus, O.; Grace Lenore Pitts, Columbus, O.; Margaret Glaze Pulling, Columbus, O.; Mae B. Schaff, Columbus, O.; Lawrence David Thomas, Lancaster, O.; Harry Porter Weld, Marysville, O.

BACHELOR OF PHILOSOPHY

(Modern Language Course)

Edna Alice Andress, Birmingham, O.; Frank Arthur Bohn, Olmsted Falls, O.; Charles Fuller Dowd, Toledo, O.; Hedwig Eloise Gamper, Columbus, O.; Victor Clarence Moon, Columbus, O.; Clara Maud Williams, Columbus, O.; Mary Grace Young, Mt. Vernon, O.

BACHELOR OF PHILOSOPHY

(English Course)

Royal Albert Abbott, Columbus, O.; Florence Louise Bell, Columbus, O.; James Henry Burgess, Big Horn, Wyoming; Alice Marie Connor, Columbus, O.; Ellen Josephine Connor, Columbus, O.; Dille Augusta Dill, Columbus, O.; Bertha Webb Eisenbeis, Columbus, O.; Ross Garfield Fox, Columbus, O.; Charles Welton Gayman, Canal Winchester, O.; Hattie DeLong Hoffman, Columbus, O.; Allen Brown Jaynes, Columbus, O.; Gordon Donald Kinder, Ottawa, O.; David Klein, Columbus, O.; Caroline Estelle Knight, Columbus, O.; Charles Howard Lisle, Pataskala, O.; Gretchen Pauline Miller, Columbus, O.; Raymond McCallum, Dayton, O.; Talmadge Archer Rickey, Columbus, O.; Carl Fletcher Roebuck, Dalton, O.; Dudley Scott, Columbus, O.; Charles Tod Singleton, Columbus, O.; Albertine Charlleen Smith, Columbus, O.; Virginia Roletta Smith, Columbus, O.

BACHELOR OF SCIENCE.

Harvey Clinton Dollison, Columbus, O.; Wilbur Latimer Dubois, Cincinnati, O.; Fred James Jeffrey, Columbus, O.; Edgar Howard Moore, Columbus, O.; Walter Leffingwell Redrow, Williamsburg, O.; Raymond Jesse Seymour, Columbus, O.; Abner Andrews Osborn, Columbus, O.

CIVIL ENGINEER.

Harry William Bowden, Minerva, O.; Fred Kellogg Pratt, New Philadelphia, O.; Charles William Shepherd, Huron, O.

ENGINEER OF MINES.

Frank Stewart Knox, Columbus, O.; Albert B. Myers, Columbus, O.; John H. Nold, Columbiana, O.

MECHANICAL ENGINEER.

Andrew Francis Cavanaugh, Dayton, O.; George Winfield Frost, Columbus, O.; Harry Smithson Needham, Columbus, O.; William Abner Knight, Columbus, O.; Alfred Heber McIntire, Mt. Vernon, O.; William George Drummond, Cleveland, O.; Arthur Hollingshead Lyon, Wauseon, O.; Robert Rusk Harkins, Columbus, O.; Joseph Henry Vosskuehler, Dayton, O.

MECHANICAL ENGINEER

(In Electrical Engineering)

Alvin Earnest Buchenburg, Holgate, O.; William Clayton Hayman, Holgate, O.; Whitney Earl Lamb, Commercial Point, O.; Robert Rowse Dunlop, Columbus, O.; Charles Marion Nicholson, Columbus, O.; Madone Carington Hunter, Salt Creek, O.; Corliss Edgar Lee, Speidel, O.; Samuel Houston Kanmacher, Columbus, O.; Earl Stimson Johnson, Plants, O.; George Ernest Schreiber, Ironton, O.; Williard Beverly Marshall, Columbus, O.

ENGINEER OF MINES

(In Ceramics)

Walter Morgan Fickes, Steubenville, O.

BACHELOR OF SCIENCE

(In Chemistry)

Clarence Philander Linnville, Hagenbaugh, O.

BACHELOR OF LAWS.

Arthur Everett Addison, B. Ph., Columbus, O.; Clarence Maywood Addison, B. Ph., Columbus, O.; Frederic Ijams Bright, Logan, O.; Anthony Brackett Calvin, A. B., (Northeastern Ohio Normal College) Youngstown, O.; Charles Ross Cary, Millersburg, O.; Alfred Jacobs Croll, A. B., (Ohio Normal University) Tontogany, O.; Roscoe Bryant Darby, Wauseon, O.; D. Homer Graven, A. B., (Ohio Normal University) Nashville, O.; Winfield Scott Hancock, A. B., (Marietta College) Marietta, O.; Ellahue Ansile Harper, A. B., (Ohio Wesleyan University) Columbus, O.; Harry Hartman Hershey, A. B., (Mt. Union College) East Greenville, O.; Benson Walker Hough (as of class of 1899), Delaware, O.; Edward Lafayette Kellison, B. Ph., Quincy, O.; Quinton R. Lane, B. Ph., Canal Winchester, O.; Ingle Alman Morris, Columbus, O.; Clayton Asa McCleary; Ph. B., (Franklin College) Lorain, O.; Robert Edward McClure, Dayton, O.; Benjamin Di Nicola, Barnhill, O.; Allen J. Seney, B. Ph., (University of Michigan) (as of class of 1899) North Baltimore, O.; Amos Claude Stevenson, A. B., (Oberlin College) Fostoria, O.; Edwin Slusser Wertz, B. Ph., Dalton, O.; Lloyd Thomas Williams, B. Ph., Jackson, O.; Frank Wilson, B. S., (Scio College) Jolly, O.; Charles Hiram Woods, Chillicothe, O.; Paul B. Yockey, B. A., Columbus, O.

BACHELOR OF SCIENCE

(In Pharmacy)

Charles Hubbel Kimberly, Columbus, O.

DOCTOR OF VETERINARY MEDICINE.

Clarence Alfred Clawson, B. Sc., (Agr.) Okeana, O.; Harry James Hammond, Sharon Center, O.; William Eddy, Cleveland, O.; Charles James Morrow, Tiro, O.

NUMBER OF STUDENTS.

The enrollment of students during the year was as follows:

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE AND COLLEGE OF LAW.

First semester, 606; second semester, 564.

OTHER COLLEGES.

Fall term, 583; winter term, 546; spring term, 470.

The whole number in attendance during the year as shown by the catalogue was 1252.

The numbers in the several colleges, departments and classes and the courses of study pursued in each are shown in the appendix to the president's report and in the catalogue filed herewith.

GIFTS DURING THE YEAR.

Besides those especially mentioned in the preceding pages of the report, the university has received by gift the following additions to its museums and collections:

DEPARTMENT OF AGRICULTURAL CHEMISTRY.

Set of products from soap works of Proctor & Gamble, Cincinnati, Ohio, packed in glass bottles and valued at $5.00.

A set of products of the Chicago Sugar Refining Co., in twenty-four glass bottles, value $10.00.

DEPARTMENT OF ELECTRICAL ENGINEERING.

Example of early Edison meter by H. W. Brooks, "02."
Circuit breaker by Cutter Electric Co.
Set of blue prints and photographs by St. Louis Car. Co.
Set of photographs by Ridgway Dynamo & Engine Co.
Set of samples of cables by National Cable Co.
Set of photographs by General Electric Co.
Set of armature coils by J. C. Lincoln.

DEPARTMENT OF INDUSTRIAL ARTS.

Eighty-two assorted files, for displaying case.
One 2 in. Sellars shaft coupling from Wm. Sellars Co.
One 2 in. Collins shaft coupling from Jones & Laughlin.
One sample tuyere from Buffalo Forge Co.

DEPARTMENT OF MECHANICAL ENGINEERING.

A quarter turn counter shaft from Mr. T. R. Almond, Brooklyn, N. Y.; an 18 in. hydraulic motor from American Impulse-Wheel Co., New York; a large mounted collection of samples of steel and iron drop forgings from The Billings & Spencer Co., of Hartford, Conn.; a sample boiler scale from Mr. O. F. Conover, Toledo, O.; one 3 in. sectional pop safety valve from the Crosby Steam Gage and Valve Co., Boston, Mass.; a large and complete collection of hangers, shafting, clutches and pulleys from the Dodge Mfg. Co., Mishawaka, Ind.; a set of small sections of the Wharton Harrison safety boiler from the Harrison Safety Boiler Works, Philadelphia, Pa.; a special lever and pop safety valve apparatus with steam gauge from the Lunkenheimer Co., Cincinnati, O.; one can of belt dressing from the Ploms Specialty Mfg. Co., Cleveland, O.; sectional models of exhaust steam injector and ejector from Schaffer & Budenburg, Brooklyn, N. Y.; a model of a universal joint from the Vanderbeek Tool Works, Hartford, Conn.

Besides the foregoing, acknowledgment is made for loan of a six horse power gas engine by the Springfield Gas Engine Co., Springfield, O.; a six horse power oil engine from the Aultman Co., of Canton, O.; a hardness testing machine, by Mr. W. J. Keep, Detroit, Mich.

Acknowledgment is made for samples of belting and belt fastenings presented by the following companies: Boston Belting Co., Boston, Mass.; Belting Co., Cincinnati, O.; Carton Belting Co., Quincy, Mass.; Detroit Oak Belting Co., Detroit, Mich.; Diamond Drill & Machine Co., Birdsboro, Pa.; Diamond Rubber Co., Akron, O.; Oliver P. Clay Co., Cleveland, O.; Fayerweather & Ladew, New York, N. Y.; The Malin & Co., Cleveland, O.; Chicago Rawhide Mfg. Co.; Chicago, Ill.; New York Belting and Packing Co., New York, N. Y.; Page Belting Co., Concord, N. H.; Revere Rubber Co., Boston, Mass.; J. E. Rhoades & Sons, Philadelphia, Pa.; Rossendale-Reddaway Belting & Hose Co., Newark, N. J.; Sampson Steel Belt Hook Co., Philadelphia, Pa.; Chas. A. Schieron & Co., New York, N. Y.; Schultze Belting Co., St. Louis, Mo.; William Sumner Belting Co., Tolland, Conn.; W. O. Talcott, Providence, R. I.; and blue prints from the following companies; Atlas Engine Works, Indianapolis, Ind.; Baldwin Locomotive Works, Philadelphia, Pa., Ball & Wood Co., New York, N. Y.; Bates Machine Co., Joliet, Ill.; C. H. Brown & Co., Fitchburg, Mass.; C. & G. Cooper Co., Mt. Vernon, Ohio; W. D. Forbes & Co., Hoboken, N. J., Hooven, Owens & Rentschler, Hamilton, O.; Fraser & Chalmers, Chicago, Ill.; Lane & Bodley, Cincinnati, O.; Mason Regulator Co., Boston, Mass.; Nordberg Mfg. Co., Milwaukee, Wis.; Philadelphia Engineering Works, Ltd., Philadelphia, Pa.; Ross Valve Co., Troy N. Y.; Watertown Steam Engine Co., Watertown, N. Y.; Vilter Mfg. Co., Milwaukee, Wis.; Watts-Campbell Co., Newark, N. J. Cuts of different styles of air compressers were presented by The Rand Drill Co., and descriptive catalogues were sent by The C. W. Hunt Co., of New York, N. Y.; The Ridgway Dynamo & Engine Co., of Ridgway, Pa.; B. F. Sturtevant Co., Boston, Mass., and the R. D. Wood Co., of Philadelphia, Pa.

ESTIMATES.

The following are the estimates for the year ending June 30, 1901:

Salaries	$167,760 00
Bonds and interest	40,037 50
Expenses of trustees	600 00
Fuel and lights	8,500 00
General repairs	5,500 00
Maintenance and repairs heat, light and power plant	4,200 00
Printing and advertising	3,000 00
Roads and grounds	1,500 00
Virginia military lands	3,500 00
Residence for astronomer	2,250 00
Library	5,500 00
Chemical store room supplies	4,250 00
Water rates	1,200 00
Department apparatus and supplies	24,985 00
Incidentals	4,500 00
Total	$277,282 50

Which will be amply met by the anticipated income of the university.

The reports of the president, the librarian and the treasurer are filed herewith and made a part of the report.

Respectfully submitted,

ALEXIS COPE, Secretary.

REPORT OF THE PRESIDENT.

Hon. J. McLain Smith, President of the Board of Trustees, Ohio State University,

Dear Sir: — I have the honor to submit herewith the annual report of the President of the University for the year ending June 30th, 1900.

The year has been marked by a most cordial cooperation of the Faculty with the President in carrying forward the work of the University. The routine work of the University has suffered no interruption worthy of note in this connection. The instruction in the various departments has been of a high grade and the results of the year are most gratifying to the friends of education.

The death of Professor Edward Orton, Ph. D., LL. D., which occurred on the sixteenth day of October, 1899, removed from the University one of the most beloved instructors the University has ever had. Dr. Orton was the first president of the University, serving in that capacity from 1873 until 1881 when he voluntarily resigned the executive duties to continue in the work of teaching. He remained as Professor of Geology until his death. Few men in Ohio have made so deep an impression upon their students. His noble character, his broad and accurate scholarship, his sympathy with students and his untiring devotion to his work united to make Professor Orton not only a commanding figure among the educational forces of the country but a man beloved by all who knew him. He served as state geologist from 1869 until his death with conspicuous ability. The University has published in pamphlet form the addresses delivered at the memorial services held in the University Chapel, Sunday, November 26th, 1899.

The enrollment of students for the year was the largest in the history of the University and reached the number twelve hundred and fifty-two. Of this number eleven hundred and ninety-seven were from the state of Ohio, representing eighty-seven ocunties, and the remaining fifty-five were from eleven different states of the Union, from the province of Ontario, from the District of Columbia and from Cuba. The widespread territory from which the University draws its students is a matter of interest and satisfaction.

Among the changes pertaining to the Faculty I note the change of rule made by the Trustees providing for an advance in rank of teachers. Hitherto it has been the custom to bring a teacher to the rank of full professor only when he was the head of a department and had earned the right to such a rank by conspicuous scholarship and success in his work. The new rule provides that men may come to the rank of full

professor without the necessity of creating new departments when the demands within the department and the experience and success of the teacher render the promotion desirable. This makes it possible to give to men who have devoted their lives to instruction a suitable rank and title when appropriate. This action is commended by the Faculty and cannot fail to produce good results in the future. For the changes in titles in the Faculty to take effect July 1st, 1900, reference is made to pages 25 and 26 of part second of this report.

The University battalion has, for the year, been under the efficient supervision of Major James Madison Burns, U. S. A., retired. During the year a considerable increase in the equipment was provided by the War Department. It was with deep regret that we learned of Major Burns' desire to be relieved of duty at the Ohio State University in order to accept a similar position at the University of West Virginia. Upon request of the Board of Trustees, Captain George L. Converse, U. S. A., retired, was detailed to serve in this position.

At the Commencement, June 13th, the University conferred one hundred and thirty-seven degrees. A detailed account of these degrees will be found in the report of the Secretary of the Board of Trustees.

THE GROWTH OF THE UNIVERSITY.

The year just closed has been marked by the largest attendance in the history of the University. This fact has brought clearly to view the needs of the immediate future. Notwithstanding the fact that the past five years have witnessed a very considerable development in the buildings of the University it is plain that a greater development is now a pressing necessity.

The legislature in session during the year with great unanimity provided for a special levy of five one-hundredths of a mill in addition to the levy heretofore made with the provision that the proceeds of the additional levy should be used for the construction of buildings. This will provide for a building for the College of Law and for a building for the department of Physics. These buildings have been a necessity for some time and their erection will prove a great relief to the present crowded quarters now much in demand for other purposes.

In the matter of other new buildings it is difficult to decide which are most needed. With no attempt to settle the question of priority I beg to suggest that the growth of the College of Engineering will soon make it impossible to provide for so large a number properly without a building of suitable plan and size. The need of a building for a library is evident to all departments. The equipment of the University in this particular is entirely too meager to satisfy the reasonable demands, to say nothing of the importance of providing first class facilities.

The departments of Botany and Horticulture need better facilities and the efficiency of the departments will be crippled to a considerable degree until the limitations are removed.

The development of interest in Veterinary Medicine — especially in sanitary lines — has shown that an increasing demand for educated veterinarians may be expected. About half of the graduates of this College are now in the service of the United States. To carry on the work of this College as it ought to be done it will be necessary to provide for advanced scientific work, which can not be done with the present facilities. Suitable buildings are the foundation for the work to which I refer.

A WOMAN'S BUILDING.

The need of a woman's building is apparent to every one. The provision by law for women at the University does not wholly meet the needs. Something ought to be done to make provision for young ladies upon the campus for a general headquarters and for a home. The increase of students has made the difficulty of securing suitable accommodations for young ladies greater. The attendance of women is hindered by the lack of accommodations. It would seem that when the state has provided the means of education it might be well to make them more available.

THE ENLARGEMENT OF BUILDINGS.

It is not possible to foresee the growth of a university. Already the University has outgrown the expectations of many of its friends. The present roll of students taxes to the utmost the buildings. In the case of Hayes Hall the present accommodations for the department of drawing are insufficient and overcrowded. At least ten thousand dollars should be expended in the enlargement of this building. Plans for enlargement have been suggested by Professor Bradford that are in harmony with the architectural design. These additions would greatly increase the efficiency of the department.

The Chemical Hall has already proved too small. The freshman class of the present year, to the number of two hundred and sixty, was required to pursue the study of Chemistry. In addition to this may be mentioned all the advanced and elective work. Any further increase in students will render the building entirely inadequate to meet the needs. An addition of at least one hundred feet to the north of the present structure should be made.

The lack of funds for these needed enlargements and improvements makes the problem of administration more embarrassing as the patronage of the University increases.

THE DEPARTMENTS.

The several departments of the University find as the University grows an increasing demand for larger and more complete equipment. The growth and efficiency of a university depends to a large degree upon the condition of its material equipment. In an institution like the State University where scientific and technical education is so prominent there is no practical limit to the money that may be wisely expended in improv-

ing the facilities for education. The growth of the Ohio State University has been very commendable in this particular owing to an intelligent and liberal supervision of the Trustees. However, with every new year new needs arise. I cannot make mention now of the detailed needs in the departments, but make special mention of the fact that the department of electrical engineering needs a considerable equipment in the way of new machinery. In electrical apparatus it is both desirable and necessary that the latest improvements be a part of the equipment. This is an item of considerable expense as the machinery is seldom worn out but usually replaced by newer and better patterns.

In the department of Astronomy considerable progress has been made during the past year in the material equipment. The work has developed the need of a zenith telescope, such as could be purchased for ten or twelve hundred dollars; a house for the same at the cost of about five hundred dollars; a sidereal chronometer at a cost of one hundred dollars; three theodolites at a cost of about one thousand dollars and some smaller items. The importance of astronomical science and the place taken by the University through the efficiency of Professor H. C. Lord abundantly warrant the additional equipment so much needed.

I beg to submit a statement from Prof. J. R. Smith as follows:

"The Board of Trustees has recognized the claims of aesthetics on the institution by adopting a general plan of grounds and buildings, laid down by a professional expert; to which the arrangement must conform; and although opinions must be permitted to differ as to the success of details, there can be no question as to the necessity of some such general plan.

I would respectfully urge the equal claim of the fine arts, historically considered, to recognition at the hands of those who govern the affairs of this growing institution. Architecture, sculpture and painting have been too closely connected with the advance of civilization to be ignored in any schemes of study which deal with the achievements of man in history; and the great improvements and multiplication of reproductive processes have made it possible to present to the eyes of students, in orderly succession, the history of these arts (especially of the first two) with a graphic success not achieved before. The teaching of language, literature, history, architecture and engineering would be much helped and stimulated by access to an even moderately equipped museum containing reproductions of the masterpieces of art."

"The following suggestions towards a working plan are herewith respectfully submitted:

1. In one of the new buildings now contemplated, or in those portions of University Hall soon to be vacated by the College of Law and the Department of Physics, let a room, with office attached, be set aside for a museum of art. To prepare this room properly (as to light,

wall-color, etc.) would cost no more than for any other university purpose.

2. With an appropriation of from $500 to $1,000 a small but educationally valuable collection of plaster casts and photographs could be purchased as the permanent nucleus of the proposed museum. There are also scattered through the various buildings a number of such objects, whose custodians might be glad to transfer them to such a room, where they could have proper care.

3. The care of the collection might, for the present, be vested in an individual or a committee of the Faculty; who should have full charge of the arrangement of the objects in the museum, the purchase of all art-works, and the right to accept or decline any gifts."

I cheerfully join in the suggestions and recommendations made by Professor Smith and call attention to the importance and desirability of developing the plan outlined.

THE DEPARTMENT OF MECHANICAL ENGINEERING.

During the current year Professor Stillman W. Robinson whose term of service dates from 1878 has made a generous contribution to the department in which he has served so conspicuously. By adding to the equipment for experimental engineering one of the best appointed testing boilers manufactured, Professor Robinson has not only greatly increased the facilities for work but has earned the grateful recognition of the University for his generosity.

CONCLUSION.

In concluding this report I cannot refrain from an expression of appreciation of the fidelity manifested by the Trustees in administering the trust reposed in them. It is also a pleasure to note the increasing appreciation of the work of the University by the people of the State.

My personal acknowledgment is due for the cordial reception given me at the beginning of my work and for the hearty cooperation of both the Trustees and Faculty in carrying it forward.

Very respectfully,

W. O. THOMPSON.

TABLE I—THE WORK OF INSTRUCTORS, 1899–1900.

Subjects	Hours per week						Number of students		
	Lectures			Laboratory					
	First Term	Second Term	Third Term	First Term	Second Term	Third Term	First Term	Second Term	Third Term
AGRICULTURE.									
Breeds of Live Stock (8)†	3	....	....	2	....	....	32	....	....
Principles of Breeding (9)	....	3	....	....	2	....	....	30	....
Stock feeding and Hygiene (10)	....	....	3	....	....	2	....	....	35
Farm Equipment (11)	3	....	....	2	....	....	19	....	....
Soils (12)	....	3	....	....	2	....	....	20	....
Farm Crops (13)	....	....	3	....	....	2	....	....	16
Butter Making and Cheese Making (15)	....	2	....	....	8	....	....	14	....
Dairy Farming (5)	....	2	....	....	2	....	....	23	....
Butter Making and Cheese Making (6)	....	....	....	....	16	....	....	23	....
Butter Mak'g and Cheese Mak'g (7, 15)	....	2	....	....	8	....	....	23	....
Special	....	....	....	....	1	....	....	8	....
Thesis	....	....	....	....	2	2	8	8	8
AGRICULTURAL CHEMISTRY.									
Principles, Nomenclature, etc. (1)	2	....	....	36	....	....	55	....	....
Organic Chemistry (8)	....	2	....	....	36	....	....	55	....
Applications of Chemistry to Agr. (9)	....	....	2	....	....	36	....	....	49
Laboratory (4)	....	2	....	36	36	36	13	13	5
Chemistry of Milk and Milk-testing (7)	....	2	....	....	....	....	....	22	....
ANATOMY AND PHYSIOLOGY.									
Human Anatomy and Physiol. (1, 51, 52)	6	6	6	5	5	4	73	66	72
General Physiology (2)	....	....	3	....	....	1	....	....	11
Histology and Hist-Chemistry (59, 4)	2	2	2	10	10	10	13	12	12
Physiological Laborat'y (53, 54, 55, 56)	1	1	2	10	7	10	9	10	13
Bacteriology	....	2	....	....	8	....	....	57	....
Microscopy (5, 58)	....	....	1	....	....	3	....	....	13
Thesis and Similar Work	....	....	....	3	3	3	6	6	6
Chemical Physiology (3)	....	....	1	....	....	6	....	....	7
ASTRONOMY.									
Astronomy and Geodesy (2)	4	....	4	....	....	....	7	....	11
General Astronomy (52)	....	....	5	....	....	....	....	....	7
Advanced Astronomy (55, 56)	2	....	....	....	....	....	2	....	....
Astronomy (54)	....	5	....	....	....	....	....	1	....
Meteorology (60)	....	....	2	....	....	....	....	....	18
Thesis and similar work	....	....	....	....	....	....	....	....	....

† The figures in brackets are the department numbers—for which see Part II of this report

TABLE I — THE WORK OF INSTRUCTORS, 1899–1900 — Continued.

Subjects	Hours per week						Number of studeuts		
	Lectures			Laboratory					
	First Term	Second Term	Third Term	First Term	Second Term	Third Term	First Term	Second Term	Third Term
Botany.									
Physiological Botany (6)	3	....	....	8	....	....	29	....	....
Medical Botany (4)	....	....	....	....	4	....	....	3	....
Medical Botany (56)	....	....	....	....	4	....	....	9	....
Systematic and Physiological Bot'y (55)	2	....	....	8	....	....	18	....	....
Physiological Botany (53, 6*a*)	3	....	....	4	....	....	12	....	....
Physiological and Economic Botany (7)	....	3	....	....	8	....	....	27	....
Laboratory Work (57, 58, 60, 64, 66)	....	....	....	6	....	10	11	....	13
Elementary Botany (1)	....	....	3	....	....	12	....	....	65
Economic Bot'y and Veg. Pathology (8)	....	....	3	....	....	8	....	....	22
Spe'al and Adv'ced Work (59, 61, 63, 65)	....	....	....	10	....	....	5	....	....
Clay Working and Ceramics.									
Ceramic Chemistry (8, 3)	....	....	1	....	10	15	....	1	5
Lectures (4)	5	....	....	....	....	....	3	....	....
Analysis of Clays and Minerals (2)	....	1	....	....	15	....	....	7	....
Lectures (6)	....	....	5	....	....	....	....	....	4
Analysis of Glasses and Glazes (1, 7)	1	....	....	15	....	....	7	....	....
Manufacture of Bricks (5)	....	5	....	....	....	....	....	3	....
Thesis and Similar Work	....	....	....	20	30	25	1	2	2
Laboratory (9, 10, 11)	....	....	....	20	20	10	2	2	1
Cement Lectures (12)	....	5	....	....	....	....	....	12	....
Ceramic Structures (13)	....	1	....	....	4	....	....	2	....
Chemistry.									
Elementary (51, 52)	3	3	....	7	7	....	58	62	....
Elementary (7)	11	11	....	62	61	....	204	152	....
Qualitative Analysis (12)	....	....	1	....	....	18	....	....	37
Qualitative Analysis (53)	1	....	....	4	....	....	10	....	....
Quantitative Analysis (55, 56, 4)	2	2	3	18	18	15	16	15	20
Organic (57, 58, 8, 9)	5	1	1	....	8	5	15	13	13
Advanced Chemistry (59, 60)	....	....	....	4	4	....	6	5	....
Applied Chemistry (16)	....	4	....	....	....	....	....	4	....
Toxicology (11)	....	....	4	....	....	....	....	....	7
Thesis and Similar Work	....	....	....	....	6	....	....	8	....
Inorganic Preparations (61*a*, 17)	1	....	....	6	....	....	7	....	....
Sanitary Analysis (15)	....	....	2	....	....	5	....	....	7
Civil Engineering.									
Land surveying (1)	10	....	....	30	....	....	29	....	....
Topography (4)	....	1	....	....	15	....	....	22	....
Railroad Surveying (2)	....	....	10	....	....	30	....	....	21
Topographical Surveying (3)	1	....	....	10	....	....	8	....	....
Working Drawing in Ry. Cons't'n (5)	....	½	....	....	15	....	....	11	....
Stereotomy (6)	....	⅓	....	....	15	....	....	13	....
Bridge Strains (7)	....	....	5	....	....	....	....	....	12

TABLE I — THE WORK OF INSTRUCTORS, 1899–1900 — Continued.

Subjects	Hours per week						Number of students		
	Lectures			Laboratory					
	First Term	Second Term	Third Term	First Term	Second Term	Third Term	First Term	Second Term	Third Term
CIVIL ENGINEERING — Concluded.									
Bridge Designing (8)	2½	....	....	10	....	....	5	....	....
Civil Engineering Laboratory (14)	....	....	....	....	12	....	....	7	....
Sanitary Engineering (10)	....	....	5	....	....	....	....	....	8
Masonry Construction (15)	5	....	....	....	....	....	6	....	....
Highways (16)	....	5	....	....	....	....	....	10	....
Water Supply (18)	....	5	....	....	....	....	....	7	....
Trusses (19)	....	....	2	....	....	6	....	....	9
Surveying (21)	....	....	2	....	....	4	....	....	8
Thesis and Similar Work	....	....	....	8	5	10	5	5	5
Roof Trusses (20)	2	....	....	6	....	....	1	....	....
DOMESTIC SCIENCE.									
Domestic Economy (7, 8, 9)	1	1	1	6	6	6	7	7	8
Domestic Economy (1, 2, 3)	1	2	1	12	12	12	23	18	17
Domestic Economy (4, 5, 6)	1	1	1	6	6	6	19	15	16
Domestic Economy (10)	....	....	1	....	....	....	....	....	21
DRAWING.									
Freehand Drawing (1)	....	....	....	20	20	7	206	175	17
Lettering (2)	....	....	....	....	....	18	....	....	134
Mechanical Drawing (3)	2	4	3	10	12	12	99	92	80
Draughting and Blue Printing (4)	....	1	....	....	4	....	....	5	....
Photography (7)	1	....	2	4	....	8	14	....	25
Mechanical Drawing (8)	1	1	....	2	2	....	9	7	....
Mechanical Drawing (10)	2	....	....	4	....	....	52	....	....
Mechanical Drawing (11)	....	1	....	....	8	....	....	1	....
Clay Modeling (12)	....	....	....	....	4	4	....	5	4
Pen Drawing (14)	....	....	....	4	....	4	5	....	9
Domestic Architecture (15)	....	1	1	....	4	2	....	12	9
Technical Drawing (5)	1	....	....	6	....	....	20	....	....
Orders of Architecture (1)	....	2	....	....	6	....	....	4	....
Styles of Architecture (2)	....	....	2	....	....	6	....	....	4
Decoration and Ornament (5)	....	1	....	....	4	....	....	1	....
Drawing (19)	....	....	1	....	....	9	....	....	26
Architecture (6)	....	....	2	....	....	6	....	....	1
Architecture (8)	....	....	2	....	....	6	....	....	1
Arts (17, 18)	1	1	....	2	4	....	12	16	....
Architecture (3)	1	1	1	8	8	8	1	1	1
Architecture (4)	2	....	....	....	....	....	1	....	....
Architecture (7)	....	3	....	....	4	....	....	1	....
Drawing (16)	....	....	1	....	....	4	....	....	14

TABLE I — THE WORK OF INSTRUCTORS, 1899–1900 — Continued.

Subjects	Hours per week						Number of students		
	Lectures			Laboratory					
	First Term	Second Term	Third Term	First Term	Second Term	Third Term	First Term	Second Term	Third Term
*Economics.									
Elements of Political Economy (51, 52)	4	4	....	2	2	....	64	80	....
Practical Problems in Economics (55)..	2	....	....	....	....	....	28	....	....
Industrial and Social Reforms (56).....	....	2	....	....	....	....	....	33	....
Ind'ial and Fin'ial His'y of the U. S. (60)	....	2	....	....	....	....	....	21	....
Seminary (61, 62).....	2	2	....	....	....	....	11	11	....
Industrial Society (53).....	2	....	....	....	....	....	21	....	....
Sociology and Statistics (63, 64).....	1	1	....	4	....	....	12	11	....
Commercial Geography (65).....	2	....	....	....	....	....	10	....	....
Thesis	....	....	....	2½	5	....	10	10	....
Socialism (54)	....	2	....	....	....	....	....	17	...
Electrical Engineering.									
Electrical Engineering (2).....	5	5	5	....	....	....	10	10	10
Electrical Designing (3).....	....	....	....	6	6	6	9	10	10
Electrical Laboratory (4).....	....	....	....	9	9	9	9	7	10
Electrical Engineering (6).....	2	2	....	....	....	....	24	20	....
Electrical Engineering (7).....	....	....	....	12	12	....	24	20	....
Thesis	....	....	....	....	....	2	....	11	11
Special	....	....	....	....	....	6	....	....	2
*English Literature.									
Introduction to Eng. Literature (51, 52)	8	8	....	....	....	....	76	42	....
The English Bible (55, 56).....	1	1	....	....	....	....	15	14	....
Shakespeare (57)	3	....	....	....	....	....	12	....	....
The Modern Novel (59.....	6	....	....	....	....	....	32	....	....
From Dryden to Johnson (61).....	2	....	....	....	....	....	7	....	....
Chaucer (67)	2	....	....	....	....	....	8	....	....
Masterpieces (65, 66)	3	3	....	....	....	....	13	11	....
Thesis Work	....	....	....	2	7	....	5	8	....
Literary Problems (69, 70).....	2	2	....	....	....	....	10	9	....
Victorian Prose (71).....	3	....	....	....	....	....	11	....	....
Elizabethan Drama (58).....	....	3	....	....	....	....	....	13	....
The Drama Since the Restoration (60)..	....	2	....	....	....	....	....	22	....
American Authors (62).....	....	6	....	....	....	....	....	50	....
Victorian Poetry (72).....	....	3	....	....	....	....	....	13	....
*Education.									
Elementary Educat'l Psychology (51)...	4	....	....	....	....	....	24	....	....
Modern Educational Theories (52).....	....	4	....	....	....	....	....	19	....
History of Education (53).....	4	....	....	....	....	....	13	....	....
The Herbartian Pedagogy (55).....	2	....	....	....	....	....	4	....	....
Philosophy of Education (58).....	....	4	....	....	....	....	....	15	....
Plato's Republic (54).....	....	2	....	....	....	....	....	10	....
Educational Value (67).....	....	2	....	....	....	....	....	11	....
Child Study (59).....	2	....	....	....	....	....	7	....	....
Scientific Method (69).....	2	....	....	....	....	....	....	15	....
Pedagogical Research (72).....	....	2	....	....	....	....	....	5	....

* Semester work.

TABLE I — THE WORK OF INSTRUCTORS, 1899–1900 — Continued.

Subjects	Hours per week						Number of students		
	Lectures			Laboratory					
	First Term	Second Term	Third Term	First Term	Second Term	Third Term	First Term	Second Term	Third Term
GEOLOGY.									
Elementary Geology (4)	....	5	....	....	3	....	....	7	....
Cosmical Geology (2, 51)	5	5	....	2	2	....	44	35	....
Paleontology (53, 54)	....	....	....	8	18	17	3	6	5
Petrography (55, 56)	....	....	....	6	6	6	2	2	2
Physical Geography (1)	....	....	5	....	....	....	....	....	25
Economic Geology (3)	....	....	5	....	....	....	....	....	11
Field Term	....	....	....	....	....	8	....	....	12
GERMAN LANGUAGE AND LITERATURE.									
Elementary German (1, 51, 52)	16	16	....	....	....	....	143	106	....
Science Reading (2, 53, 54)	2	2	....	....	....	....	25	18	....
German Literature (4, 55, 56)	8	8	....	....	....	....	51	51	....
The German Drama (57)	3	....	....	....	....	....	14	....	....
The German Prose (58)	....	3	....	....	....	....	....	14	....
Faust I—(59)	2	....	....	....	....	....	2	....	....
Deutsche Kulturgeschichte (64)	....	1	....	....	....	....	....	5	....
Old High German (68)	2	....	....	....	....	....	2	....	....
Mediaeval Lyrics (62)	....	2	....	....	....	....	....	4	....
Deutscher Aufsatz (63)	1	....	....	....	....	....	5	....	....
Middle High German (61)	2	....	....	....	....	....	7	....	....
Sanskrit (71)	2	....	....	....	....	....	1	....	....
Gothic (67)	2	....	....	....	....	....	3	....	....
*GREEK LANGUAGE AND LITERATURE.									
Elementary Greek	5	5	....	....	....	....	10	9	....
Xenophon's Memorabilia (51)	4	....	....	....	....	....	37	....	....
Odyssey (52)	....	4	....	....	....	....	....	34	....
Lysias (53)	4	....	....	....	....	....	17	....	....
Homer (54)	....	4	....	....	....	....	....	15	....
Ancient Art (59, 60)	2	2	....	....	....	....	26	24	....
Attic Drama (68)	....	2	....	....	....	....	....	8	....
Graduate	½	½	....	....	....	....	1	1	....
*HISTORY AND POLITICAL SCIENCE.									
HISTORY.									
General History of Europe to close of Middle Ages (51)	6	....	....	....	....	....	81	....	....
From close of Middle Ages to French Revolution (52)	....	6	....	....	....	....	....	69	....
Political and Constitutional History of England to the Accession of the Stuarts (53)	3	....	....	....	....	....	28	....	....

* Semester work.

TABLE I — THE WORK OF INSTRUCTORS, 1899–1900 — Continued.

Subjects	Hours per week: Lectures: First Term	Lectures: Second Term	Lectures: Third Term	Laboratory: First Term	Laboratory: Second Term	Laboratory: Third Term	Number of students: First Term	Number of students: Second Term	Number of students: Third Term
*HISTORY AND POLITICAL SCIENCE. — Concluded.									
HISTORY.									
From Accession of Stuarts to Present Time (54)	....	3	....	....	....	....	....	19	....
Political and Constitutional History of United States (55, 5, 56)	8	8	....	....	....	....	63	46	....
History of Europe from 1789 to 1815 (57)	3	....	....	....	....	....	7	....	....
History of Europe since 1815 (58)	....	3	....	....	....	....	....	10	....
History of European Colonies (67, 70)	2	2	....	....	....	....	6	6	....
Pro-Seminary (61, 62)	2	2	....	....	....	....	18	18	....
American Colonial History (63)	....	3	....	....	....	....	45	....	....
United States Colonial and Constitutional History (64)	....	3	....	....	....	....	....	48	....
Historical Bibliography (72)	....	1	....	....	....	....	....	26	....
POLITICAL SCIENCE.									
International Law (51)	2	....	....	....	....	....	29	....	....
Municipal Government (52)	....	2	....	....	....	....	....	21	....
Political Institutions of the United States (53)	3	....	....	....	....	....	30	....	....
Comparative Political Institutions of Europe and America (54)	....	3	....	....	....	....	....	26	....
History of Diplomacy (56)	....	2	....	....	....	....	....	21	....
Thesis Work	....	....	....	4	4	....	14	14	....
HORTICULTURE.									
Elements of Horticulture (1)	2	2	2	4	4	4	22	6	17
Pomology and Viticulture (5)	2	....	....	4	....	....	4	....	....
Vegetable Gardening and Seed Growing (6)	....	3	....	....	2	....	....	15	....
Small Fruit Culture (7)	....	....	3	....	....	3	....	....	10
Elements of Floriculture (8)	1	....	....	2	....	....	4	....	....
Commercial Floriculture (9)	....	2	....	....	2	....	....	8	....
Home Flower Gardening (10)	....	....	1	....	....	2	....	....	5
Arboriculture (11)	2	....	....	2	....	....	8	....	....
Forestry (12)	....	2	....	....	2	....	....	9	....
Landscape Gardening (13)	....	....	1	....	....	2	....	....	7
Special	....	2	....	....	1	....	....	2	....
INDUSTRIAL ARTS AND SHOPWORK.									
INDUSTRIAL ARTS.									
Advanced Designing (4)	....	....	....	6	6	6	1	1	1
Machine Design (7)	....	....	....	....	....	6	....	....	6
Workshop Appliances (5)	....	....	6	....	....	....	....	....	8
Shop Equipment (3)	3	3	3	....	....	....	1	1	1

* Semester work.

TABLE I — THE WORK OF INSTRUCTORS, 1899-1900 — Continued.

Subjects	Hours per week						Number of students		
	Lectures			Laboratory					
	First Term	Second Term	Third Term	First Term	Second Term	Third Term	First Term	Second Term	Third Term
SHOPWORK.									
Carpentry and Pattern Making (7, 1)	....	....	....	10	9	16	44	37	46
Forging (11, 2)	....	....	....	10	13	12	39	45	35
Foundry Work (3)	....	....	....	4	....	....	30	....	....
Chipping and Filing (4)	....	....	....	10	6	6	25	40	19
Machine Work (13)	....	....	....	6	6	6	9	3	19
Advanced Machine Work (14)	....	....	....	6	6	6	8	4	2
Advanced Pattern Making (9)	....	....	....	....	....	6	....	....	2
Advanced Forging (12)	....	....	....	....	....	6	....	....	2
Advanced Machine Work (15)	....	....	....	4	8	6	1	4	6
Cabinet Work (8)	....	....	....	....	6	....	....	11	....
Thesis	....	....	....	....	....	....	....	5	3
*LATIN.									
Cicero, Livy (51)	8	....	....	....	....	....	62	....	....
Plautus, Terence (52)	....	8	....	....	....	....	....	56	....
Horace (53)	8	....	....	....	....	....	31	....	....
Juvenal, Pliny (54)	....	8	....	....	....	....	....	26	....
Roman Historians (55)	3	....	....	....	....	....	11	....	....
Elegiac Poets (56)	....	3	....	....	....	....	....	12	....
Pharmaceutical (1, 59, 60)	5	5	....	....	....	....	22	15	....
Thesis and Similar Work	....	....	....	....	2	....	....	1	....
Prose Composit'n and Tr'slat'n (63, 64)	2	2	....	....	....	....	10	5	....
Greek and Roman Antiquities (67)	2	....	....	....	....	....	7	....	....
MATHEMATICS.									
Elementary Algebra (1)	5	....	....	....	....	....	13	....	....
Elementary Algebra (2)	5	5	5	....	....	....	17	19	15
Plane Geometry (3, 3a)	10	5	....	....	....	....	30	25	....
Solid Geometry (13)	....	10	....	....	....	....	....	40	....
Plane Trigonometry (14)	25	....	10	....	....	....	182	....	29
Analytical & Spherical Trigonom't'y (15)	....	10	....	....	....	....	....	141	....
College Algebra (16)	....	15	....	....	....	....	....	146	....
Plane Analytics (17)	....	....	25	....	....	....	....	....	129
Space Analytics (18)	20	....	....	....	....	....	98	....	....
Differential Calculus (19)	....	20	....	....	....	....	....	86	....
Integral Calculus (20)	....	....	20	....	....	....	....	....	80
Differential Equations (11)	2	....	....	....	....	....	19	....	....
Least Squares (8)	2	....	....	....	....	....	11	....	....
*MATHEMATICS.									
College Algebra (67)	15	....	....	....	....	....	119	....	....
Problems on all Past Work (65, 66)	1	1	....	....	....	....	4	3	....
Advanced Mathematics (63, 64)	5	5	....	....	....	....	10	5	....
Trigonometry (68)	....	12	....	....	....	....	....	87	....
Special	....	5	....	....	....	....	....	4	....

* Semester work.

TABLE I — THE WORK OF INSTRUCTORS, 1899–1900 — Continued.

Subjects	Hours per week						Number of students		
	Lectures			Laboratory					
	First Term	Second Term	Third Term	First Term	Second Term	Third Term	First Term	Second Term	Third Term
Mechanical Engineering.									
Mechanism (3)	....	5	....	....	....	4	....	20	9
Analytical Mechanics (6)	10	10	....	....	....	....	26	25	....
Strength of Materials (7)	....	....	5	....	....	....	....	....	24
Thermodynamics (8)	5	....	....	....	....	....	18	....	....
Prime Movers (9)	....	5	....	....	....	....	....	19	....
Machinery and Millwork (10)	....	....	5	....	....	....	....	....	19
Experimental Laboratory (12, 13, 14, 15, 16, 17)	....	1	....	12	12	10	14	16	14
Machine Design (18)	5	5	....	....	....	....	9	9	....
Hydraulic Machinery (20)	....	....	3	....	....	....	....	....	9
Timber and Masonry (22)	....	5	....	....	....	....	....	8	....
Experimental Eng'ring Laboratory (25)	....	....	....	....	....	10	....	....	6
Experimental Eng'ring Laboratory (28)	....	....	....	....	....	4	....	....	7
Materials of Construction (23)	5	....	....	....	....	....	8	....	....
Power Plants (32)	....	....	5	....	....	....	....	....	12
Graduate Work	4	4	....	10	10	6	4	3	1
Care of Boiler and Engine	....	1	....	....	....	....	....	26	....
Theses (21)	....	....	....	2	6	20	10	9	9
Metallurgy and Mineralogy.									
Metallurgy (4)	5	5	....	....	....	....	15	12	....
Metallurgical Laboratory (5)	1	1	1	10	10	10	28	19	25
Ore Dressing (8)	2	....	....	....	....	....	4	....	....
Assaying (6)	....	1	....	....	10	....	....	14	....
Mineral Chemistry (9)	....	....	5	....	....	....	....	....	4
Mineralogy (2)	....	....	3	....	....	....	....	....	65
Determinative Mineralogy (3)	....	....	....	....	....	10	....	....	7
Thesis and Similar Work	....	....	....	....	....	3	....	....	3
Metallurgical Construction (7)	....	1	....	....	10	....	....	4	....
Military Tactics and Science.									
Military Drill	....	....	....	....	....	....	400	344	281
Tactics	....	2	....	....	....	....	....	86	....
Mine Engineering.									
Mine Surveying (1)	5	....	....	9	....	....	8	....	....
Ventilation and Haulage (2)	....	5	....	....	3	....	....	5	....
Mine Engineering (5)	5	5	5	2	3	1	5	5	5
Mine Operating (3)	....	....	5	....	....	2	....	....	4
Mine Surveying (4)	5	....	....	9	....	....	3	....	....
Mine Engineering (6)	....	....	1	....	....	8	....	....	4

TABLE I — THE WORK OF INSTRUCTORS, 1899–1900 — Continued.

Subjects	Hours per week						Number of students		
	Lectures			Laboratory					
	First Term	Second Term	Third Term	First Term	Second Term	Third Term	First Term	Second Term	Third Term
PHARMACY.									
Pharmacy (6) (7)	3	2	....	....	10	....	21	8	....
Dispensatories (8)	....	....	2	....	....	10	....	....	18
Pharmaceutical Chemistry (9)	3	....	....	10	....	....	8	....	....
Extemporaneous Chemistry (10)	....	2	....	....	10	....	....	8	....
Lectures and Dispensing Practice (11)	....	....	2	....	....	10	....	....	8
Materia Medica (12) (13)	3	3	....	....	....	....	11	9	....
Materia Medica and Therapeutics (14)	....	....	3	....	....	....	....	....	7
Pharmaceutical Assaying (15)	2	....	....	10	....	....	8	....	....
Methods of Manufacture (16)	....	2	....	....	10	10	....	8	....
Pharmacy (18) (Vet. Students)	....	....	5	....	....	....	....	....	4
Special (17)	....	....	....	....	10	....	....	1	....
*PHILOSOPHY.									
Pschology (51)	4	....	....	....	....	....	45	....	....
Psychology (53)	3	....	....	....	....	....	46	....	....
Logic and Ethics (52)	....	4	....	....	....	....	....	45	....
Logic (54)	....	6	....	....	....	....	....	43	....
History of Modern Philosophy (56)	....	3	....	....	....	....	....	14	....
His. of Ancient and Medieval Phil. (57)	3	....	....	....	....	....	4	....	....
Advanced Work (59) (60)	2	2	....	....	....	....	6	5	....
Physiology & Exp. Psychology (61) (62)	2	2	....	....	4	....	8	5	....
Study of Religion (63) (64)	4	2	....	....	....	....	3	3	....
Special	6	1	....	....	....	....	1	1	....
Ethics (55)	3	....	....	....	....	....	13	....	....
PHYSICAL EDUCATION.									
Young men	....	....	....	44	44	44	564	564	564
Young women	....	....	....	16	16	16	85	85	85
PHYSICS.									
Elementary Physics (1)	10	10	....	....	....	....	101	81	....
Mechanics and Heat (2) (51) (52)	7	7	6	....	....	....	131	116	108
Problems (3)	2	2	2	....	....	....	31	24	24
Electricity and Magnetism (4)	3	....	....	....	....	....	11	....	....
Physical Laboratory	....	....	....	45	45	45	13	60	56
Mechanics, Sound and Heat (53)	1	....	....	12	....	....	26	....	....
Electricity and Magnetism (54)	....	1	....	....	10	....	....	26	....
Special	....	2	....	....	....	....	....	4	....
*RHETORIC AND ENGLISH LANGUAGE.									
Paragraph Writing (51) (5)	30	....	....	....	....	....	385	....	....
Practical Rhetoric (5) (52)	....	27	....	....	....	....	....	364	....
Analysis of Prose (53) (54)	8	8	....	....	....	....	38	47	....
Advanced Rhetoric (3) (63) (64)	4	4	....	....	....	....	79	68	....

* Semester work.

TABLE I — THE WORK OF INSTRUCTORS, 1899-1900 — Continued.

Subjects	Hours per week						Number of students		
	Lectures			Laboratory					
	First Term	Second Term	Third Term	First Term	Second Term	Third Term	First Term	Second Term	Third Term
*Rhetoric and English Language. — Concluded.									
Rapid Writing (55) (56)	1	1	....	4	4	....	33	33	....
Brief Making and Argument (57)	3	....	....	....	....	....	23	....	....
Short Stories (60)	....	2	....	....	....	....	....	21	....
Poetics (59)	2	....	....	....	....	....	16	....	....
Studies in Exposition (58)	....	3	....	....	....	....	....	18	....
Rhetorical Theory & Criticism (61) (62)	2	2	....	10	10	....	14	11	....
Teacher's Course (67) (68)	2	2	....	....	....	....	47	40	....
History of the Engilsh Language (69)	2	....	....	....	....	....	58	....	....
Old English (71) (72)	2	2	....	....	....	....	25	22	....
Middle English Philology (73)	2	....	....	....	....	....	7	....	....
Historical English Grammar (74)	....	2	....	....	....	....	....	5	....
Development of Prose (70)	....	2	....	....	....	....	....	40	....
Extempore Speaking (75) (76)	2	2	....	....	....	....	22	19	....
*Romance Languages.									
FRENCH									
Elementary French (1) (51)	16	....	....	....	....	....	173	....	....
Modern Prose and Plays (1) (52)	....	16	....	....	....	....	....	140	....
Modern French Literature (55) (56) (2)	8	8	....	....	....	....	71	65	....
Recent French Prose Writers (58)	....	3	....	....	....	....	....	15	....
Advanced Prose Composition (59) (60)	1	1	....	....	....	....	12	11	....
French Comedy (57)	3	....	....	....	....	....	16	....	....
French Seminary (63) (64)	3	3	....	....	....	....	10	8	....
Thesis and Similar Work	....	....	....	2	2	....	....	....	....
Scientific French (53) (3) (54)	2	2	....	....	....	....	16	9	....
SPANISH									
Grammar and Readings (51) (52)	2	2	....	....	....	....	15	16	....
Veterinary Medicine.									
Anatomy (28)	5	....	....	....	....	....	17	....	....
General Pathology (29)	....	5	....	....	....	....	....	17	....
Special Pathology (30)	....	....	5	....	....	....	....	....	17
General Surgery (24)	....	....	....	10	10	....	6	6	....
Clinic (19)	....	....	....	12	12	12	11	11	13
Special Pathology (20) (21)	5	3	....	....	....	....	9	9	....
General Therapeutics (22)	....	....	5	....	....	....	....	....	6
Lectures and General Pathology (14)	5	....	....	....	....	....	13	....	....
Osteology (11)	5	....	....	10	....	....	7	....	....
Meat Inspection (27)	5	....	....	....	....	....	9	....	....
Special Pathology (15) (16)	....	5	5	....	....	....	....	10	9
Diseases of the Cow (17)	....	3	....	....	....	....	....	22	....

* Semester work.

TABLE I — THE WORK OF INSTRUCTORS, 1899-1900 — Concluded.

Subjects	Hours per week						Number of students		
	Lectures			Laboratory					
	First Term	Second Term	Third Term	First Term	Second Term	Third Term	First Term	Second Term	Third Term
VETERINARY MEDICINE — Concl'd.									
Surgcial Diseases and Operations (18)	5	5	....	....	....	....	6	5	....
Myology (12)	....	5	....	....	10	....	....	6	....
Neurology (13)	....	....	5	....	....	....	....	....	6
Principles of Horse-shoeing (26)	....	....	5	....	....	....	....	....	7
Obstetrics (23)	....	3	3	....	2	....	....	12	6
Canine Disease (31) (32)	5	3	....	....	....	....	8	8	....
Opthalmology (33)	....	2	2	....	....	....	....	9	6
ZOOLOGY.									
Comparative Zoology (1, 51, 52)	4	4	4	8	8	8	86	80	80
Com. Anatomy of Vertebrates (53, 55)	1	....	....	12	....	....	10	....	....
Com. Anatomy of Vertebrates (54, 56)	....	1	....	....	12	....	....	6	....
Zoology and Anatomy (58, 60)	....	....	....	....	10	....	....	5	....
Economic Entomology (4)	2	2	2	....	....	....	12	11	11
Systematic and Practical Entomology (7)	....	....	3	....	....	....	....	....	11
Comparative Zoology (64)	....	2	....	....	4	....	....	23	....
Zoology (57)	....	....	....	6	....	....	5	....	....
Zoology (65)	....	....	....	4	4	....	2	2	....

TABLE II — SHOWING THE WHOLE NUMBER OF DEGREES IN COURSE CONFERRED SINCE THE FOUNDING OF THE UNIVERSITY.

	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Bachelor of arts	1	1	6	2	2	1	5	4	6	8	6	1	7	2	6	9	12	19	13	17	18	8	14
Bachelor of philosophy	..	..	..	2	..	2	2	1	1	2	6	7	4	8	8	5	5	19	26	27	27	31	38
Bachelor of science	5	5	1	2	5	3	2	4	2	4	4	8	2	10	7	11	7	9	4	10	10	2	7
Bachelor of science in agr	..	..	..	..	..	..	..	1	1	..	..	..	2	3	3	..	..	2	4	4	5	5	7
Bachelor of science in chemistry	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....	....	....	....	1	1
Bachelor of science in Dom. Sci.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....	....	....	....	..	1
Bachelor of science in H., F.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	3	1	1	1	2	1	1
Bachelor of Science, Ind. Arts	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....	....	1	1	..	....
Bachelor of science in Pharmacy	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....	....	....	....	..	1
Civil engineer	..	..	..	..	..	1	1	1	3	3	4	1	2	2	7	9	7	9	11	4	8	7	3
Mechanical engineer	..	..	1	..	2	4	1	3	1	2	4	2	3	2	5	2	1	2	4	9	5	6	9
Electrical engineer	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	9	8	15	17	13	10	7	11
Engineer of mines	..	..	1	1	..	..	1	2	4	1	4	2	..	..	1	1	4	1	6	3	2	3	3
Engineer of mines, in Ceramics	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....	....	....	....	..	1
Graduate in pharmacy	..	..	..	..	..	..	..	..	..	3	..	2	3	6	5	5	3	11	12	11	7	..	....
Master of pharmacy	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....	1	....	1	..	....
Doctor of veterinary medicine	..	..	..	..	..	..	..	..	..	1	..	1	4	..	4	5	..	4	2	3	....	..	4
Master of arts	..	..	..	..	..	..	..	..	..	..	..	1	1	1	2	..	..	2	....	4	4	3	8
Master of science	..	..	..	1	..	..	..	..	..	..	..	1	1	2	2	..	2	....	3	3	2	3	3
Master of agriculture	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	....	1	..	....
Master of Science in H. & F.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....	....	1	1	1	....
Doctor of philosophy	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	....	....	....	....	..	....
Doctor of science	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	....	1	....	..	....
Bachelor of laws	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9	18	15	16	6	23	22	21	25
Master of laws	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	4	2	....	6	....	....	..	....
Totals	6	7	9	8	9	11	12	16	18	24	28	26	30	36	65	79	70	112	118	135	126	99	137

TABLE III — SHOWING THE NUMBER OF STUDENTS IN THE GENERAL TECHNICAL AND PROFESSIONAL COURSES.

	1890–91.	1891–92.	1892–93.	1893–94.	1894–95.	1895–96.	1896–97.	1897–98.	1898–99.	1899–1900.
General Courses (College of Arts)	137	151	194	245	256	322	327	358	371	419
Technical Courses (other Colleges except Law)	166	259	381	368	424	453	453	511	541	603
Professional Courses (College of Law)	....	55	67	72	65	100	132	148	191	201
*Graduate students and summer school	2	....	....	1	....	94	97	133	75	45
Totals	305	465	642	686	745	969	1,019	1,150	1,178	1,268

* Until 1896, graduate students have been included in the first three classes.

REPORT OF THE LIBRARIAN.

Dr. W. O. Thompson, President Ohio State University,

DEAR SIR:—The following report on the condition of the university library is herewith respectfully submitted:

BUILDING AND EQUIPMENT.

The library has this year occupied the entire east end of Orton Hall and the room formerly used as a faculty room in university hall. The room in university hall has been used for the law library. It has been too small to accommodate properly the law students, and it is earnestly recommended that before the opening of the university next fall another and larger room be provided for these books.

The removal of the law lecture room from the first floor of Orton Hall and the tearing down of the temporary partition which divided it from the library has been of the greatest advantage to the work of the library. This change has made possible a complete rearrangement of the books and papers kept on the first floor. The main room is 70′ x 40′ in size. In the southwest corner there has been provided a temporary work room for the preparation of books for binding, the southeast corner having cases for unbound papers and magazines. The central part is used for the filing of state and municipal documents and the entire north end is devoted to U. S. government documents. In all three parts of the room space has been left for reading tables, and there is no room in the library where more important work is done by students.

The removal of the law books from the balcony has given room for growth in the classes of science and engineering. The books were not rearranged this year, but the entire balcony arrangement will probably be changed by the beginning of next year. This will necessitate the return to the main library of the oak cases taken to the law library. By the removal of the books on geology to the balcony, room is gained on the main floor for one more reading table.

Special credit is given to Mr. McCracken for his solution of the problem of providing light for the tables. By dropping lamps from the ceiling the proper light has been secured, together with freedom in rearrangement of tables, and without the disadvantage of cutting the cork carpet in order to bring the wires up from the floor.

There is still room in the main library for a year's increase in books without encroaching upon the reading room space. Year after next it

will undoubtedly be necessary to put in more cases which will, of course, mean fewer tables. *And this year's use of the library has demonstrated the fact that the reading rooms are already too small.* The problem of how to meet the demands which are certain to be made on the library before there is any possibility of finding relief in a new building, promises to be a very difficult one to solve,—if indeed there can be any solution. The prospects are only too sure that within the next two years, and certainly before three years have expired—which time seems to be the very earliest at which there can be hope of having a new building completed—the library will have to ignore many crying demands because of lack of room.

Such conditions make it imperative that everything be done to secure a library building at the earliest possible moment. To that end the librarian is already engaged in the comparative study of college library buildings. By such a study only can the danger of erecting a building, unsuited to its purpose in some particulars, be minimized. In May of this year a visit of inspection was made to the library of the University of Illinois. The new library building of Princeton University ought to be visited as early next year as possible.

BOOKS.

The number of books recorded on the accession books of the library June 30th, 1900, is 35,430. These records show that 7,443 have been added within the last year. As a matter of fact about half of this number were received in the library before the close of last year, but were not recorded because of lack of help and lack of room. Most of these were the U. S. public documents, the gift of which was noted in last year's report. Of all the additions to the library, none has been more valuable than these public documents. Another installment of about six hundred volumes came from Washington in the early spring of this year, after Captain Cope had personally visited the document office and had secured the personal influence of Mr. Ferrel, the superintendent of documents. Between five hundred and six hundred more are expected in the fall when they are returned from Spain by the U. S. Minister. It is a matter of special congratulation that the university was given the first chance of securing these books at the small expense of paying the transportation across the ocean. This is undoubtedly due to the efforts of Captain Cope in securing the interest of Mr. Ferrel.

State and municipal documents are being received constantly, and form a very important part of the library. It has been a source of gratification to the librarian to notice that since the special work in public documents was undertaken in the university library other libraries have begun to see the necessity of having special assistants in charge of this work. The claim is not made that this is due to the uni-

versity's action, but it shows that it is beginning to be recognized that document work is an important line of library activity.

A comparatively large number of gifts have come to the library from private sources. A list of donors accompanies this report.

Special mention should be made of a gift relating to the history of the Quakers in America. Through the interest and active effort of Mr. J. J. Janney of this city, the Miami Quarterly Meeting of the Society of Friends in Ohio has donated a collection of books illustrative of the influence of the Quakers in American history, and especially during the colonial period. When completed the collection will have cost one hundred and fifty dollars, and will be of the highest service as it touches a field of American history in which our library was seriously deficient. In addition, Philadelphia Yearly Meetings of both branches of the Society of Friends have donated a considerable number of volumes of historic and doctrinal character, thus supplementing the gift of the Miami Quarterly Meeting.

Mention has been made in previous reports of the gift of the books from the library of Mr. Wm. Siebert. Most of these books have now been received. In addition to these, there have been purchased by Mr. John Siebert and Mr. Louis Siebert over four hundred dollars' worth of books on German history. These will form the more important part of the "Siebert Library of German History," as the collection is to be called. It is understood that one hundred dollars a year will be furnished by each of these gentlemen for keeping up purchases in this line. None of these books have yet been entered on the library records, since it was desired to wait until all the books had been received, before recording them or putting them on the shelves for use.

Many of the books received from Mr. Wm. Siebert's library have no bearing at all on German history and it is definitely understood that these books, after being duly marked as having been received from him, are to be placed in those parts of the library where they naturally belong. This is the only safe principle to follow in accepting gifts for a library, and should be carefully adhered to. Books on a special subject are naturally kept together so that special collections can well be known by their collector's name, but it should never become a practice to accept libraries composed of books on miscellaneous subjects with the understanding that the books are to be kept together. If that were to be done the university library would soon be in a condition similar to that in which a neighboring college found itself when Wesley's sermons could be found in any part of the room.

During the year circulars have been sent out by the alumni association to alumni residents in Ohio, calling attention to the needs of the library. A copy of the circular is attached to this report.

In the annual report of last year it was said that the chief duty of a university library was "to secure books, more books, and always more

books." This statement should be repeated this year with even greater emphasis.

USE.

It is a pleasure to report that the use of the library has increased much more rapidly than has the student body, thus showing that the library is performing a more important part in the educational work of the university.

The great aim of the library is to teach the students the use of books, and all the reference work is directed towards the end of helping the student help himself. Much more time is required for this instructional work than would be used in simply supplying the books or information needed.

It was found necessary this year to place on special shelves the books reserved by professors for required reading. These shelves were not open to the students and each book was taken out on a special card for use in the reading room. Next year it will probably be necessary to limit the time during which one student can use the book, because of the large number of students dependent on one book, the library having very few duplicates.

STAFF.

There has been no change in the library staff during the year. Miss Townshend, Miss Kellicott, Miss Jeffrey, Miss Allen and Mr. Guittard all have retained their positions with very few changes in the work for which each is held responsible.

Very respectfully,

OLIVE JONES, Librarian.

REPORT OF THE TREASURER.

COLUMBUS, OHIO, *June 30th, 1900.*

To the HONORABLE J. MCLAIN SMITH, *President Board of Trustees of the Ohio State University*:

SIR: — I hand you herewith my annual report for the fiscal year ending the 30th day of June, 1900. This report is accompanied by proper vouchers for all disbursements.

Respectfully,

L. F. KIESEWETTER, *Treasurer.*

STATEMENT I.

DETAILED STATEMENT OF RECEIPTS BY L. F. KIESEWETTER, TREASURER, DURING FISCAL YEAR ENDING JUNE 30, 1900.

Date	From whom received	For what purpose	Amount	Total
1899				
July 3	F. W. Prentiss, Treas. O. S. U.	Balance on hand from former treasurer		$9,088 04
7	Geo. B. Kauffman	Sale store room cards	$111 59	
	Geo. B. Kauffman	Merchandise	152 07	
	U. S. Treasurer	Annuity act of Aug. 30, 1890	25,000 00	
	M. F. Early and Jane Beal	Deed act of March 14, 1889	2 00	
	Alfred H. Barnes	Deed act of March 14, 1889	2 00	
	Louisa M. Byers	Deed act of March 14, 1889	2 00	25,269 66
Aug. 9	B. F. Thomas	Ninth and tenth installm't rent 1898–9	85 00	
	Margaret L. Hurles	Deed act of March 14, 1889	2 00	
	Thomas Cloud	Deed, act of March 14, 1889	2 00	89 00
Sept. 20	Commrs. Sinking Fund.	Int. on endowment	5,000 00	
	Henry C. Lord	Scrap copper sold	4 25	
	B. F. Carmean	Deed, act March 14, 1889	2 00	
	R. W. Funk	Dorm. fee, Mr. King	1 50	
	E. E. Harrold, storekpr.	Sale of 100 storeroom cards	500 00	
	L. H. Godman	Unpaid fees of last year	7 50	5,515 25
23	E. E. Harrold, storekpr.	Sale of 100 storeroom cards	500 00	
	Nat. Brick Mfrs. Assn.	Endowment scholarship in ceramics	250 00	
	E. E. Harrold, storekpr.	Sale of 80 storeroom cards	400 00	1,150 00
Oct. 20	B. F. Thomas, Secy.	Amt. retd. of sub. to A. A. A. S.	188 51	
	Alexis Cope, Bursar	Students' fees	13,700 00	
	Commrs. Sinking Fund.	Int. on endowment	5,000 00	18,888 51
Nov. 10	Auditor of State	Req. No. 25, O. S. U. fund	14,956 67	
	Auditor of State	Req. No. 26, O. S. U. fund	33,437 50	
	Honline & West	Freight paid by mistake	8 70	
	Martha Loister	Deed, act March 14, 1889	2 00	
	Margaret Shough	Deed, act March 14, 1889	2 00	
	Joseph Smith	Deed, act March 14, 1889	2 00	
	S. G. Lindsay	Deed, act March 14, 1889	2 00	
	Gen. Elec. Co.	Credit on account	2 00	48,412 87
Dec. 1	Ohio Nat'l Bank	Proceeds sale 30,000 refunding bonds sold Nov. 9, 1899		32,705 00
7	Commrs. Sinking Fund.	Int. on endowment		3,500 00

STATEMENT I — Continueu.

Date	From whom received	For what purpose	Amount	Total
1899				
Dec. 15	Auditor of State.....	Req. No. 27, O. S. U. fund		15,110 00
	E. E. Harrold, storekpr.	80 coupon cards sold to students	400 00	
	Benj. F. Thomas.....	1st and 2nd installments rent, 1899–1900	85,00	
	Geo. B. Kauffman.....	Ninth and 10th installment rent, 1898–1899; 1st, 2nd & 3rd 1899–1900	225 00	
	Alexis Cope, Bursar....	Students' fees	200 00	
	Nora Heath.....	Deed, act of March 14, 1889	4 00	
	Alexis Cope, Bursar....	Fees 38 auditor's tickets	38 00	952 00
20	L. H. Houston.....	Deed, act of March 14, 1889	2 00	
	Emerson McMillin.....	Fellowship in astronomy	90 00	
	Emerson McMillin.....	Scholarship in economics	100 00	192 00
21	M. P. Post.....	Freight and cartage paid for him.....	1 25	
	F. E. Sanborn.....	Freight and cartage paid for him.....	20 54	
	Alexis Cope, Bursar....	Students' fees	294 63	316 42
30	Commrs. Sinking Fund.	Interest on endowment		3,093 50
1900				
Jan. 11	Auditor of State.....	Req. No. 28, O .S. U. fund		14,987 06
Feb. 3	Neal Postlewaite.....	Diploma fee, class of 1899	5 00	
	Paul System Co.....	Credit on account...	49 54	
	W. H. Scott.....	Laboratory fees, summer school ...	14 00	
	E. A. Hitchcock.....	Fee for testing boilers	10 00	
	C. W. Mesloh.....	7th, 8th, 9th & 10th installment rent, 1898–99; 1st & 2nd, 1899–1900	108 00	
	Alexis Cope, Bursar....	Students' fees	4,500 00	
	Commrs. Sinking Fund.	Interest on endowment	5,500 00	10,186 54
23	Auditor of State.....	Req. No. 30, O. S. U. fund	4,474 17	
	Alexis Cope, Bursar....	Students' fees	8,500 00	
	J. W. Stimson.....	Damage to property.	1 00	12,975 17
Mar. 9	Auditor of State.....	Req. No. 29, O. S. U. fund		15,037 72
30	Commrs. Sinking Fund.	Interest on endowment	2,750 00	
	Alexis Cope, Bursar....	Students' fees	3,800 00	
	B. F. Thomas.....	3rd, 4th, 5th & 6th installments rent, 1899–1900	170 00	
	Alexis Cope, Bursar....	Students' fees	200 00	
	Buckeye Engine Co.....	Sale of old engine...	450 00	
	F. E. Kester.....	Sale 3 bamboo rods..	15	

STATEMENT I — Concluded.

Date	From whom received	For what purpose	Amount	Total
1900				
	W. G. Pengelly.....	Pictures of Dr. Orton	17 50	7,387 65
April 4	Auditor of State.....	Req. No. 31, O. S. U. fund		15,166 74
25	Auditor of State.....	Req. No. 32, O .S. U. fund		15,146 17
May 18	Auditor of State.....	Req. No. 33, O. S. U. fund		14,981 06
	Auditor of State.....	Req. No. 34, O. S. U. fund		7,875 00
22	Geo. B. Kauffman.....	Rent	180 00	
	E. E. Harrold.....	Store room cards....	400 00	
	Lewis Merriman.....	Deed, act Mar. 14, 1889	2 00	
	Edw. Orton, Jr.....	Printing memorial ..	19 00	
	W. H. Kinnear.....	Deed, act Mar. 14, 1889	2 00	
	Wm. T. Magruder.....	Use of machinery...	12 30	
	Wm. T. Magruder.....	Broken tools	12 76	
	W. H. Scott.....	Lub. oil and deodorizer	34	628 40
31	Ohio National Bank....	Sale of $10,000 refunding bonds		10,906 00
June 7	C. W. Mesloh.....	1st, 2nd, 3rd, 4th, 5th, 6th installments rent, 1899–1900		108 00
	Edward Orton, Jr.....	Sales of material....	50 00	
	Commrs. Sinking Fund.	Interest on endowment	6,500 00	
	M. P. Post.....	Test in dept. ceramics	1 25	6,551 25
13	Auditor of State.....	Req. No. 35, O. S. U. fund		14,904 06
27	Commrs. Sinking Fund.	Interest on W. J. Bryan fund	8 15	
	Commrs. Sinking Fund.	Interest on endowment fund	1,860 72	1,868 87
	J. A. Bownocker.....	Comm'c't luncheon	59 00	
	E. A. Eggers.....	Rent to June 1, 1900	150 00	
	F. E. Sanborn.....	Sale of scrap iron..	36 74	
	Alexis Cope, Bursar....	Diploma fees	735 00	
	Alexis Cope, Bursar....	Students' fees	665 12	
	Alexis Cope, Bursar....	Auditor's tickets	30 00	1,675 86
30	Alexis Cope, Bursar....	Storeroom cash sales and cards		950 00
	Total	.....	.....	$315,617 80

STATEMENT II.

DETAILED STATEMENT OF DISBURSEMENTS BY L. F. KIESEWETTER, TREASURER, DURING FISCAL YEAR ENDING JUNE 30, 1900.

Date	To whom paid	For what purpose	No	Amount
1899				
July 1	J. McLain Smith	Expenses as trustee	1	$5 95
	T. J. Godfrey	Expenses as trustee	2	25 95
3	Wm. Cannan	Labor	3	11 27
	Kuhn Artificl. Stone Co.	Cement walk (balance) due on contract	4	380 00
	Jno. T. Mack	Expenses as trustee	5	18 50
5	Columbus Gas Co.	Gas	6	66 89
6	Hutton Bros.	Painting	7	12 00
	Buckeye H. and L. Co.	Leather	8	80
	Blackwood, Green & Co.	Repairs	9	3 90
	J. S. Abbott & Co.	Glass	10	2 00
	Fish Stone Co.	Stone work	11	10 00
	Fitzpatrick & Hoepfner.	Closet bowl	12	8 55
	F. E. Fleischer	Labor	13	18 25
	J. C. Perry	Labor	14	4 23
	Peter Henderson & Co.	Lawn mower	15	12 00
	Krauss, B., B. & Co.	Tin roller	16	8 40
	Eimer & Amend	Scientific apparatus	17	20 00
	B. F. Thomas	Cash advanced	18	15 01
	West'h'se E. & Mfg. Co.	Repairs	19	4 00
	Wards Nat. Sci. Est.	Lenckhart charts	20	42 00
	Glouster Net & Tw. Co.	Seine	21	9 50
	J. S. Teeter	Labor	22	30 00
	Wm. Roberts	Labor	23	35 00
	E. Doddington & Co.	Lumber	24	2 10
	J. S. Schofield	Paint	25	4 25
	Sherwood Mfg. Co.	Repairs	26	6 00
	Murphy Iron Works	Pins	27	4 50
	W. H. Case	Labor	28	30 00
	E. Harrington Son & Co.	Chain	29	18 77
	H. Mithoff & Co.	Strainer cloth	30	95
	Columbus Brass Co.	Castings	31	18 00
	W. C. McCracken	Cash advanced	32	2 00
	New Col. Bridge Co.	Beams, rods, etc.	33	35 73
	B. D. Potts	Hardware	34	4 63
	Palmer & Beck	Repairs	35	50 85
	Lawrence Press Co.	Printing	36	4 50
	C. V. Brown	Advertising	37	5 00
	C. L. Kelly	Advertising	38	4 00
	J. L. Trauger	1200 copies Bot. Bulletin No. 1	39	81 20
	J. N. Bradford	Cash advanced	40	13 20
	McClelland & Co.	Ink	41	1 80
	Drawing Supply Store.	Supplies	42	3 30
	J. M. & W. Westwater.	Electric supplies	43	6 10
	General Electric Co.	Electric supplies	44	52 00
	F. A. Fish	Labor	45	12 00
	J. C. Covan	Labor	46	7 02
	P. Hayden S. Hdw. Co.	Castings	47	69 20
	Western Elictric Co.	Electric supplies	48	41 39
	Schilling Foundry Co.	Castings	49	12 08
	Shoedinger, Fearn & Co.	Bolts, etc.	50	74
	J. G. Biddle	Scientific apparatus	51	46 85
	J. B. Colt & Co.	Magic lantern	52	30 00
	F. C. Caldwell	Cash advanced	53	31 12
	Philip Long	Commencem't luncheon and cafe partitions	54	350 00
	Mrs. Edith R. Hubler.	Extra service as clerk	55	8 55

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
July 6	Western Electric Co....	Telegrams	56	$4 23
	Tracy Wells Co.....	Jap rods	57	2 75
	R. E. McIntosh.....	Labor	58	10 80
	M. C. Hunter.....	Labor	59	14 32
	H. C. Nidy.....	Labor	60	4 65
	Frankenberg Bros.....	Mailing tubes	61	1 00
	Cherington P. & E. Co.	Rubber stamps	62	75
	Green, Joyce & Co.....	Bunting	63	10 99
	Central Union Tel. Co..	Telephone messages	64	2 50
	Hann & Adair.....	Printing	65	15 70
	Paul Jones.....	Expenses as trustee.....	66	1 00
	Chas. T. Howe.....	Music for commencem't	67	29 00
	Z. L. White & Co.....	Cheese cloth.....	68	1 82
	L. B. Wing.....	Expenses as trustee.....	69	5 00
	Columbus Supply Co...	Hardware	70	61 74
	Col. Mill & Mine S. Co.	Hardware	71	65 17
	Mrs. A. Farnham.....	Brushes	72	9 00
	Florence Bell.....	Clerical work	73	1 65
	Grace Eagleson.....	Clerical work	74	8 43
	A. W. Livingston's Sons	Flowers	75	18 75
	G. N. Carman, Treas...	Membership N. C. A. C. and S. S.....	76	3 00
	American Dist. Tel. Co.	Watch boxes	77	27 00
	S. M. Tracy.....	Plants	78	46 20
	W. A. Kellerman.....	Cash advanced	79	13 59
	Freda Detmers.....	Labor	80	25 00
	L. C. Riddle.....	Labor	81	58 05
	W. H. Anderson.....	Books	82	405 25
	Howald & Conklin.....	Tin rollers	83	5 10
	Erner & Hopkins.....	Electric apparatus	84	124 03
	Tallmadge Hdw. Co....	Hardware	85	5 72
	H. Cole Co.....	Cross section paper.....	86	7 40
	Eagle Lock Co.....	Locks	87	11 00
	Library Bureau.....	Outfit	88	2 75
	W. T. Magruder.....	Cash advanced	89	18 28
	Blackwood, Green & Co.	Paint	90	17 55
	Geo. Trowbridge.....	Carpentry	91	2 00
	Keuffel & Esser Co.....	Tapes	92	5 36
	Star Milk Cooler Co....	Cooler	93	24 00
	L. Hoster Brewing Co..	Sprouts	94	9 88
	John Immel & Son.....	Repairs	95	18 80
	Yardley & Harsh.....	Pail	96	1 50
	Nitschke Bros	Office supplies	97	12 33
	Central Ohio Paper Co.	Paper	98	10 50
	A. H. Barber Mfg. Co.	Ammonia	99	6 98
	Capital City Mach. Wks.	Machinery and castings	100	103 88
	R. J. Seymour.....	Messenger service	101	7 00
	Champlin Printing Co..	Printing	102	135 50
	Columbus Transfer Co..	Coupe services	103	7 00
	J. C. Porterfield.....	Basket ball	104	6 00
	Franklin Toilet Sup. Co.	Laundry	105	10 16
	Engelke & Bigelow.....	Freight and draying...	106	39 83
	Murray City Coal Co...	Coal	107	82 78
	Frank L. Sikes.....	Costs O. S. U. vs. Cuppett & Webb.....	108	31 56
	John Wanamaker.....	Books	109	4 89
7	Columbus Street Ry. Co.	Street car tickets.....	110	5 00
29	C. B. Guittard.....	Salary, June, 1899.....	111	50 00
	Alexis Cope.....	Salary, July, 1899.....	112	187 50
	C. E. Barnet.....	" "	113	65 00
	Jean Blackford.....	" "	114	54 17

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
July 29	Edith D. Cockins.....	Salary, July, 1899.....	115	$58 33
	Dennis Clifford	" "	116	45 00
	James Kelley	" "	117	25 00
	Mrs. Edith R. Hubler..	" "	118	33 33
	Frank Ruhlen	" "	119	60 00
	F. K. Luke.....	" "	120	50 00
	J. F. Cunningham.....	" "	121	50 00
	A. F. Hall.....	" "	122	60 00
	A. G. McCall.....	" "	123	20 00
	W. C. McCracken.....	" "	124	150 00
	C. M. Low.....	" "	125	54 17
	Wm. Standley	" "	126	50 00
	B. LeBay	" "	127	50 00
	G. A. Rose.....	" "	128	65 00
	A. Chantler	" "	129	40 00
	G. A. Goodspeed.....	" "	130	40 00
	J. H. Brown.....	" "	131	40 00
	D. D. Geren.....	" "	132	40 00
	W. Whitestine.....	" "	133	40 00
	H. Chantler.....	" "	134	40 00
	G. C. Denny.....	" "	135	40 00
	W. N. Cook.....	" "	136	40 00
	W. Townsel.....	" "	137	25 00
11	Laning Printing Co....	Bal. due for ptg. cat....	138	35 00
15	J. McLain Smith.....	Exp. m't'g com. July 14, 1899	139	7 21
17	H. W. Johns Mfg. Co..	2-30 bbl. red roof paint	140	47 42
24	Olive B. Jones.....	1-10 sal. yr. end'g. June 30, 1900	141	135 00
29	C. H. Woodruff.....	Sal. as carp. July, 1899	142	60 00
	Jos. Garretson	Salary for July, "	143	35 25
Aug. 1	T. J. Godfrey.....	Expenses as trustee....	144	8 55
	R. M. Rownd.....	Postage	145	15 00
	L. B. Wing.....	Expenses as trustee.....	146	5 25
	Webb Sta. & Print. Co.	Stationery, etc.....	147	28 35
	Cherington P. & E. Co.	Stamps	148	4 00
	A. N. Marquis & Co....	Book	149	2 94
	Champlin Printing Co..	Printing	150	44 25
	Ruggles-Gale Co	Blank book	151	9 00
	Central Union Tel. Co..	Telephone service	152	72 75
	Manufac's' O. & G. Co.	Lard	153	14 82
	Grace Eagleson	Clerical work	154	3 60
	Tracy-Wells Co	Sundries	155	20 97
	American Dist. Tel. Co.	Messenger service	156	85
	R. J. Seymour.....	" "	157	20 25
	Frank Huddleson	" "	158	1 18
	Thos. F. Hunt.....	Exps. to San Francisco	159	126 25
	Columbus Bnk. Note Co.	Stationery	160	37 50
	A. H. Smythe.....	Office supplies	161	1 35
	Berlin Printing Co.....	Printing	162	4 50
	Erner & Hopkins.....	Electric supplies	163	1 95
	American Sand Co.....	Sand	164	54 10
	Marion Peck	Labor	165	36 00
	Thos. Boude	"	166	22 50
	W. H. Case.....	"	167	37 50
	Waters Governor Co...	Valve	168	16 66
	McCabe Hang. Mfg. Co.	Bolts	169	18 00
	West. Kieley S. S. Co..	Valves	170	72 00
	Wheeler C. & Eng. Co.	Tubes	171	8 25
	Bourne & Know's M. Co.	Gaskets	172	23 95
	New. Col. Bridge Co...	Iron	173	35 58

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Aug. 1	Adams-Bagnall El. Co.	Arc lamps	174	$200 00
	West'gh'se El. Mfg. Co.	Electric machinery	175	500 00
	McDonald Bros	Cesspool	176	60
	Kelton & Converse	Lumber	177	47 21
	J. C. Howard	Painting, etc	178	92 00
	Frank Watkins	Painting	179	295 00
	Columbus Sewer P. Co.	Flue lining	180	2 22
	A. F. Fenstermaker	Painting	181	83 00
	Columbus Brass Co.	Water closets	182	119 75
	J. W. Cawthon	Carpentry	183	15 75
	J. W. Schneider	"	184	15 75
	M. B. Geary	"	185	14 50
	Eli Hiatt	"	186	15 75
	J. S. Abbott & Co.	Glass	187	16 75
	A. S. W. Huffman	Plumbing	188	40 22
	Harper's Illus. Syndicate	Advertising cuts	189	17 20
	Champlin Printing Co.	Printing	190	64 25
	Oberlin Annual	Advertising	191	10 00
	S. C. Derby	Cash advanced	192	69 25
	J. C. Perry	Labor	193	10 53
	F. E. Fleischer	"	194	25 28
	Murray City Coal Co.	Coal	195	10 93
	L. L. Hill	Clerical work	196	13 00
	Standard Disinfect. Co.	Sheep dip	197	2 50
	Warren & S'th'k C. Co.	Repairs	198	9 00
	A. A. Hall	B'd'g and breeding cows	199	32 00
	Blackwood, Green & Co.	Hardware	200	41 92
	Jacob Weisheimer	Corn	201	22 35
	Glucose Sugar Ref. Co.	Gluten meal	202	19 50
	Nitschke Bros	Envelopes, etc	203	5 15
	Kemp & Burpee Mfg. Co.	Repairs	204	4 30
	Franklin Toil. Sup. Co.	Laundering	205	2 11
	Capital City Mach. Wks.	Tools and machinery	206	7 35
	John Immel & Son	Repairs	207	9 10
	W. O. Thompson	Expenses as president	208	70 20
	Creamery Pack Mfg. Co.	Dairy supplies	209	81 31
	W. H. Siebert	Model of brain	210	10 00
	Clara Armstrong	Labor on herbarium	211	9 15
	Karl Kellerman	" "	212	4 50
	L. C. Riddle	" "	213	28 05
	Payne, McD. Hdw. Co.	Hardware	214	21 13
	Lena Dennis	Labor	215	5 00
	Central Ohio Paper Co.	Paper	216	37 80
	W. A. Kellerman	Cash advanced	217	49 16
	W. R. Beattie	Labor on herbarium	218	10 05
	Emma Beattie	" "	219	24 60
	Harriet G. Burr	" "	220	11 70
	Edna Armstrong	" "	221	24 60
	Freda Detmers	" "	222	8 10
	J. H. Randall	Carpentry	223	52 75
	James Penn	Hauling	224	2 75
	Mabel Huddleson	Work in library	225	4 00
	A. F. Fenstermaker	Decorating rooms	226	50 00
	Wm. Burdell, Jr.	Roll and truss	227	4 25
	Hann & Adair	Printing	228	13 15
	Schoedinger, F. & Co.	Tools	229	2 80
	Geo. D. Cross Lum. Co.	Lumber	230	32 52
	D. S. White	Cash advanced	231	11 00
	T. L. Griffin	Clerical work	232	30 00
	W. H. Hoskins	Advertising	233	8 75
	Wm. Burdell, Jr.	Turf goods	234	12 60
	Tallmadge Hardware Co.	Hardware	235	7 48

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Aug. 1	Columbus Supply Co...	Hardware supplies.....	236	$419 14
	H. Braun Sons & Co...	Drugs & surg. inst'm't's	237	16 83
	Bausch & Lomb Opt. Co.	Optical parts	238	2 88
	E. L. Moseley.....	Bird skins.....	239	58 30
	Bauer & Baumeister....	Repairs	240	3 50
	Col. Mill & Mine S. Co.	Hardware	241	58 80
	Engelke & Bigelow.....	Freight and draying...	242	33 04
	Fred J. Heer.....	Catalogues	243	240 00
	Bucher Engraving Co..	Printing	244	96 82
	A. A. Griffing Iron Co	Radiators	245	61 01
	J. P. Covan.....	Labor	246	55 25
	Columbus Gas Co.....	Gas	247	52 43
	Lutheran Book Concern.	Paper & covers for cat.	248	75 00
	R. M. Rownd, P. M....	Postage	249	20 00
15	James B. Loff.....	Labor	250	6 60
16	R. M. Rownd, P. M....	Postage	251	16 00
22	W. O. Thompson.....	Salary, August, 1899...	252	416 67
	Alexis Cope	Salary August 1899.....	253	187 50
26	C. E. Barnet.....	" "	254	65 00
	Jean Blackford	" "	255	54 17
	W. C. McCracken.....	" "	256	150 00
	J. Covan	" "	257	70 00
	G. A. Rose.....	" "	258	65 00
	F. Ruhlen	" "	259	60 00
	A. F. Hall.....	" "	260	60 00
	Edith D. Cockins.....	" "	261	58 33
	C. M. Low.....	" "	262	54 17
	F. K. Luke.....	" "	263	50 00
	J. F. Cunningham.....	" "	264	50 00
	W. Standley	" "	265	50 00
	B. LeBay	" "	266	50 00
	A. Chantler	" "	267	40 00
	G. A. Goodspeed.....	" "	268	40 00
	J. H. Brown.....	" "	269	40 00
	D. D. Geren.....	" "	270	40 00
	W. Whitestine	" "	271	40 00
	H. Chantler	" "	272	40 00
	G. C. Denny.....	" "	273	40 00
	M. N. Cook.....	" "	274	40 00
	W. Townsel	" "	275	25 00
	James Kelley.....	" "	276	25 00
	Mrs. E. R. Hubler.....	" "	277	33 33
	A. G. McCall.....	" "	278	20 00
	Dennis Clifford	" "	279	8 71
	E. M. Smothers.....	" "	280	20 32
	Benj. Irwin	" "	281	15 97
	Joe. Garretson	" "	282	40 50
25	Charles Woodruff	September wages	283	53 50
26	Clinton Schaeffer.....	Carpentry	284	18 00
	J. W. Schneider.....	"	285	38 75
	M. B. Geary.....	"	286	11 75
	Eli Hiatt	"	287	38 75
	J. W. Cawthon.....	"	288	38 75
	William Bechel	"	289	18 00
	C. H. Woodruff.....	Salary as carp. Aug. '99.	290	65 00
Sept. 5	L. B. Wing.....	Expenses as trustee.....	291	2 00
	T. J. Godfrey.....	" "	292	5 00
	Von Gerichten A. G. Co.	Glass	293	20 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Sept. 5	A. H. Andrews & Co..	Slating	294	$8 00
	Wm. M. Taylor Mantel and Grate Co.	Mantel	295	135 00
	Frank Watkins	Painting	296	65 00
	J. C. Howard	"	297	29 25
	Jas. S. Schofield	Oil	298	5 00
	A. L. Yardley	Screens	299	60 00
	Brust & Bauch	Masonry	300	42 40
	Columbus Brass Co.	Castings	301	98 83
	The Hanna Pt. Mfg. Co.	Bronze	302	5 85
	T. S. Edgington	Papering	303	15 00
	Western Kieley S. S. Co.	Traps and valve	304	51 75
	Lewis Fink	Painting	305	131 00
	J. H. Ridgway	Taxidermy	306	37 50
	Batterson Decor. House.	Decorating	307	248 65
	Western Union Tel. Co.	Telegraph service	308	10 48
	F. C. McKinney	Guide and messenger	309	20 62
	A. G. McCall	Guide work	310	9 00
	H. S. King	"	311	5 00
	E. H. Moore	"	312	5 00
	K. G. Thompson	"	313	3 00
	M. F. Osborn	"	314	3 50
	H. T. Osborn	"	315	3 50
	Merle Rickett	"	316	3 00
	The Webb Sta. & Pr. Co.	Office supplies	317	4 30
	R. L. Polk & Co.	City directory	318	5 00
	Central Union Tel. Co..	Telephone service	319	35
	Orvis & Marshall	Mimeograph ink	320	90
	D. H. Derflinger	Gasoline	321	3 83
	Standard Oil Co.	Oil	322	23 32
	India Alkali Works	Savogran	323	18 14
	American Dist. Tel. Co.	Alarm boxes	324	32 00
	Bourne & Knowles	Gaskets	325	1 35
	Jos. Dixon Crucible Co.	Graphite	326	6 50
	H. Braun Sons & Co.	Lead and ammonia	327	1 40
	Col. Mill & Mine S. Co.	Hardware	328	10 64
	Scioto Boiler Works.	Breeching and heater	329	137 00
	Thos. Boude	Labor	330	40 50
	M. Peck	"	331	40 50
	W. H. Case	"	332	39 00
	Col. Wire & Iron Wks.	Wire guards	333	31 50
	Palmer & Beck	Roofing, etc.	334	173 44
	Electric Appliance Co..	Electric apparatus	335	33 70
	W. T. Magruder	Cash advanced	336	12 62
	Cherrington P. & E. Co.	Rubber type	337	4 60
	A. H. Smythe	Labels	338	85
	J. S. Maclean	Drawers	339	58 50
	Chas. Hall	Labor	340	1 00
	E. H. Bailey	Janitoring	341	25 80
	Burr Waters	"	342	9 38
	A. E. Adair	Masonry	343	4 05
	P. M. Griffin	Samples of woods	344	5 00
	Crosby St. G. & V. Co.	Repairs	345	29 05
	Brown & Sharpe Mf. Co.	Standard instruments	346	12 70
20	Columbus Supply Co.	Hardware	347	97 20
5	J. S. Maclean	Lumber	348	18 50
	Central Ohio Paper Co.	Paper	349	3 94
	McClelland & Co.	Electric supplies	350	3 68
	J. G. Biddle	"	351	2 25
	J. P. Covan	Extra labor	352	6 25
	Lincoln Electric Co.	Electric machinery	353	349 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Sept. 5	Acme Paving Co.....	Paving	354	$80 08
	Erner & Hopkins.....	Electric supplies	355	19 69
	M. P. Streett.....	Masonry	356	135 31
	Capital City Mach. Wks.	Hardware	357	36 85
	Springfield Gas Eng. Co.	Gas engine	358	150 00
	Fitzpatrick & Hoepfner.	Connecting gas engine..	359	23 63
	J. A. Brashear.....	Spectroscope	360	200 00
	J. F. Donahue & Co....	Hardware	361	6 17
	Library Bureau	Cards	362	6 00
	Schoedinger, F'rn. & Co.	Mica	363	7 88
	Bausch & Lomb Opt. Co.	Reprints	364	2 94
	Sheppard & Co.....	Labels	365	2 25
	E. T. Jenks.....	Locks	366	8 00
	Freda Detmers	Labor on herbarium....	367	10 00
	W. R. Beattie.....	"	368	7 15
	Kelton & Converse.....	Lumber	369	105 02
	Karl Kellerman.....	Labor	370	10 20
	L. C. Riddle.....	" on herbarium....	371	6 30
	Nitschke Bros	Stationery, etc.....	372	18 90
	De Laval Separator Co.	Repairs	373	3 20
	Laura L. Hill.....	Clerical work	374	14 00
	A. F. Wilcox.....	Labor	375	261 82
	Blackwood, Green & Co.	Hardware	376	108 75
	James Penn	Carting	377	27 70
	Sells & Co.....	Feed	378	15 00
	L. Hoster Brewing Co..	Sprouts	379	5 02
	A. W. Livingston's Sons.	Barley and peas.....	380	10 65
	Jacob Weisheimer	Corn	381	23 35
	Columbus Sewer P. Co.	Pipe	382	13 43
	E. D. Heller.....	Labor	383	25 37
	J. C. Perry.....	"	384	32 58
	J. H. Burgess.....	"	385	8 75
	J. Booth	"	386	15 34
	F. E. Fleischer.....	"	387	27 62
	C. Schaffer	Carpentry	388	40 25
	M. J. Snow.....	Labor	389	33 62
	A. F. Fenstermaker....	Painting, etc.....	390	157 72
	J. H. Randall.....	Carpentry	391	28 75
	O. S. Lear.....	Typewriter and neostyle	392	122 75
	Fay & Scott.....	Lathe	393	145 35
	Metta L. Seymour.....	Clerical work	394	7 25
	R. A. McClure.....	Lumber	395	131 13
	E. Kaiser	Sundries	396	1 48
	Herbert Osborn	Cash advanced	397	3 45
	Edward Orton, Sr.....	"	398	10 95
	The Fish Stone Co.....	Labor and stone.....	399	11 50
	Spahr & Glenn.....	Printing	400	2 50
	Krauss, Butler &. B. Co.	Carpets and curtains....	401	110 67
	Champlin Printing Co..	Printing	402	5 25
	Hann & Adair.....	"	403	1 85
	Lawrence Press Co.....	Vouchers	404	8 00
	Christian World Co....	Advertising	405	4 78
	Republican Publish. Co.	"	406	15 00
	O. T. Corson.....	"	407	22 50
	Moufort & Co.....	"	408	14 00
	Curts & Jennings.....	"	409	16 80
	The Interior	"	410	22 68
	Taylor, Williams & Co.	Coal	411	3 08
	Murray City Coal Co...	"	412	44 52
	E. A. Cole & Co.....	"	413	2 94
	W. F. Lavery.....	Extra services	414	27 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Sept. 5	J. L. Trauger	Binding	415	$0 64
	Keasbey & Mattison Co.	Magnabestos	416	121 74
	Engelke & Bigelow	Freight and carting	417	55 92
	E. Doddington & Co.	Lumber	418	249 26
	Tallmadge Hardware Co.	Hardware	419	123 33
	W. C. Mills	Sal., July and Aug., '99	420	70 00
	Columbus Gas Co.	Gas	421	39 00
30	W. O. Thompson	Salary, Sept., 1899	422	416 67
23	Alexis Cope	" "	423	187 50
30	C. E. Barnet	" "	424	65 00
	Jean Blackford	" "	425	54 17
	E. E. Harrold	" "	426	90 00
	T. F. Hunt	" "	427	250 00
	G. W. Knight	" "	428	250 00
	W. F. Hunter	" "	429	250 00
	A. M. Bleile	" "	430	225 00
	C. N. Brown	" "	431	225 00
	A. C. Barrows	" "	432	225 00
	R. D. Bohannan	" "	433	225 00
	B. L. Bowen	" "	434	225 00
	S. C. Derby	" "	435	225 00
	J. V. Denney	" "	436	225 00
	E. A. Eggers	" "	437	225 00
	J. P. Gordy	" "	438	225 00
13	W. A. Kellerman	" "	439	225 00
30	W. R. Lazenby	" "	440	225 00
	Wm. McPherson	" "	441	225 00
	W. T. Magruder	" "	442	225 00
	H. Osborn	" "	443	225 00
	J. R. Smith	" "	444	225 00
	W. H. Scott	" "	445	225 00
	B. F. Thomas	" "	446	225 00
	H. A. Weber	" "	447	225 00
13	N. W. Lord	" "	448	200 00
30	F. A. Ray	" "	449	200 00
	G. B. Kauffman	" "	450	200 00
	E. Orton, Jr.	" "	451	180 00
	J. N. Bradford	" "	452	180 00
	F. E. Sanborn	" "	453	180 00
	H. C. Lord	" "	454	160 00
	F. C. Clark	" "	455	160 00
	G. W. McCoard	" "	456	160 00
	C. P. Linhart	" "	457	160 00
	D. S. White	" "	458	160 00
	F. C. Caldwell	" "	459	160 00
	Edward Orton	" "	460	150 00
	E. A. Hitchcock	" "	461	150 00
	C. S. Prosser	" "	462	150 00
	W. D. Gibbs	" "	463	160 00
	P. G. Bowman	" "	464	140 00
	W. H. Page	" "	465	140 00
	W. H. Siebert	" "	466	135 00
	S. A. Norton	" "	467	120 00
	E. B. Kinkead	" "	468	120 00
	J. E. Boyd	" "	469	120 00
	C. E. Sherman	" "	470	110 00
	T. E. French	" "	471	110 00
	J. R. Taylor	" "	472	110 00
	C. W. Mesloh	" "	473	110 00
	A. W. Hodgman	" "	474	110 00
	J. H. Schaffner	" "	475	100 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Sept. 30	W. E. Henderson	Salary, Sept., 1899	476	$100 00
	J. A. Bownocker	" "	477	100 00
	W. A. Knight	" "	478	100 00
	C. L. Arnold	" "	479	100 00
	K. D. Swartzel	" "	480	100 00
23	C. B. Morrey	" "	481	100 00
30	W. L. Graves	" "	482	100 00
	C. A. Bruce	" "	483	100 00
	Geo. H. McKnight	" "	484	90 00
	Wm. Renck	" "	485	85 00
	J. S. Hine	" "	486	85 00
	F. L. Landacre	" "	487	85 00
	C. P. Crowe	" "	488	80 00
	A. E. Vinson	" "	489	80 00
23	C. P. Souther	" "	490	80 00
30	F. E. Kester	" "	491	80 00
	Mrs. Jas. A. Canfield	" "	492	75 00
	E. O. Randall	" "	493	70 00
	D. F. Pugh	" "	494	70 00
	W. A. Landacre	" "	495	70 00
	W. F. Lavery	" "	496	70 00
	C. B. Frederick	" "	497	70 00
	Jno. B. Sanborn	" "	498	70 00
	E. E. Somermeier	" "	499	70 00
	T. K. Lewis	" "	500	60 00
	F. A. Fish	" "	501	60 00
	O. V. Brumley	" "	502	50 00
	S. W. Martin	" "	503	50 00
	A. V. Bleininger	" "	504	40 00
	J. B. Parker	" "	505	30 00
	Grace L. Pitts	" "	506	30 00
	M. Dresbach	" "	507	30 00
	D. A. Kohr	" "	508	60 00
	H. C. Gore	" "	509	30 00
	J. H. Vosskuehler	" "	510	30 00
	A. H. McIntire	" "	511	30 00
	E. L. Ball	" "	512	30 00
	J. W. Young	" "	513	30 00
	F. J. Hale	" "	514	30 00
	S. W. Collett	" "	515	25 00
	H. W. Brown	" "	516	25 00
	J. H. Collins	" "	517	20 00
	J. A. Shauck	" "	518	17 50
	E. H. Bailey	" "	519	15 00
	R. E. McIntosh	" "	520	12 50
	W. C. McCracken	" "	521	150 00
	J. P. Covan	" "	522	70 00
	G. A. Rose	" "	523	65 00
	F. Ruhlen	" "	524	60 00
	A. F. Hall	" "	525	60 00
	E. D. Cockins	" "	526	58 33
	C. B. Guittard	" "	527	55 00
	H. N. Townshend	" "	528	55 00
	G. S. Kellicott	" "	529	55 00
	M. D. Jeffrey	" "	530	55 00
	Lucy Allen	" "	531	55 00
	C. M. Low	" "	532	54 17
	F. K. Luke	" "	533	50 00
	H. C. Price	" "	534	50 00
	Wm. Standley	" "	535	50 00
	B. LeBay	" "	536	50 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Sept. 30	D. C. Huddleson	Salary, Sept., 1899	537	$50 00
	T. Boude	" "	538	45 00
Oct. 28	W. H. Case	Salary, October, 1899	539	45 00
Sept. 30	M. Peck	Salary, Sept., 1899	540	40 00
	A. Chantler	" "	541	43 33
	G. A. Goodspeed	" "	542	40 00
	J. H. Brown	" "	543	40 00
	D. D. Geren	" "	544	40 00
	W. Whitestine	" "	545	40 00
	H. Chantler	" "	546	40 00
	G. C. Denny	" "	547	40 00
	M. N. Cook	" "	548	40 00
16	Dennis Clifford	" "	549	8 00
30	W. Townsel	" "	550	25 00
	J. C. Perry	" "	551	12 50
	Mrs. E. R. Hubler	" "	552	33 33
	James Kelley	" "	553	25 00
	Benj. Irwin	" "	554	45 00
	W. C. Weir	" "	555	20 00
	A. G. McCall	" "	556	20 00
	W. C. Mills	" "	557	35 00
9	W. C. Conklin	Extra jan. serv's (meeting A. A. A. S.) 18 d'ys	558	23 23
11	Edw. Orton, Pres. A. A. A. S.	Con. to exp's. of m't'g. Aug. 19–26, 1899	559	500 00
18	Wm. Parks	Labor	560	5 00
	Wm. Cannan	Ceramics scholars'p fees	561	12 50
	Addie Lucas	Labor	562	7 50
	Geo. Lucas	"	563	2 50
19	Lily Weeks	"	564	5 00
20	Lizzie Keenan	"	565	5 00
	Mrs. Helen Keenan	"	566	6 25
25	J. McLain Smith	Expenses as trustee	567	8 21
	Lily Weeks	Labor	568	5 00
30	Earl Conway	Sal., Sep., '99 (20 days)	569	13 33
	Alice Dufour	Salary, Sept., 1899	570	25 00
	C. F. Dowd	" "	571	20 00
	H. W. Kennedy	Emerson McMillin fellowship in astronomy.	572	30 00
	Wm. Cannan	Ceramics scholarship	573	20 00
	W. E. Mann	Em. McMillin scholarship in economics	574	25 00
	F. M. Hamilton	Salary, Sept., 1899	575	80 00
	W. C. Conklin	" "	576	40 00
	C. A. Grate	" "	577	30 00
	H. C. Allen	" "	578	115 00
29	Mrs. M. J. Kellenberger.	Serv. dept. dom. econ.	579	20 00
30	F. O. Clements	Salary, Sept., 1899	580	30 00
	J. F. Jeffrey	" "	581	10 00
Oct. 2	Dennis Clifford	Cleaning buildings	582	32 26
	Joe Garretson	Salary, Sept., 1899	583	37 50
	Lily Weeks	Labor	584	5 00
3	R. M. Rownd, P. M.	Postage	585	51 80
4	L. B. Wing	Ex. m't'g of b'd & com.	586	7 30
	F. C. Caldwell	Cash advanced as per receipt filed	587	232 75
5	Carl Freigan	Books	588	7 00
	Publishers' Weekly	Trade list	589	2 00
	Chas. Bryson	Repairing chairs	590	29 65
	D. Appleton & Co.	Annual cyclopedia	591	5 00
	Amer. Jour. of Physiol.	Book	592	5 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Oct. 5	Library Bureau	Blank book	593	$8 50
	Psychological Review	Book	594	3 00
	Ira Miller	Notarial work	595	3 60
	A. H. Smythe	Let. files, paste, brushes	596	3 90
	Boston Bookbinding Co.	Binder	597	1 13
	Olive Jones	Cash advanced	598	1 25
	Burham Ant. Book Store	Books	599	5 00
	F. E. Inskeep	"	600	7 50
	S. A. Norton	"	601	55 00
	W. Morelan	Carpentry	602	1 00
	Mabel Huddleson	Work in library	603	7 00
	Boston Book Co.	Books	604	57 00
	G. E. Stechert	"	605	410 52
	Seraphim Bl'nk. Bk. Co.	Binding	606	210 65
	E. H. Bailey	Labor	607	17 10
	E. G. Bailey	"	608	9 69
	D. L. Auld	Engraving	609	95
	Columbus Brass Co.	Fixtures	610	1 75
	A. E. Adair	Masonry	611	4 50
	Columbus Sewer P. Co.	Cement	612	90
	W. T. Magruder	Cash advanced	613	37 23
	L. S. Starrett Co.	Tools	614	21 73
	Crosby St. G. & V. Co.	Gage	615	5 70
	J. S. Maclean	Book-case	616	32 50
	L. S. Wells	Book	617	5 25
	H. F. Whickham	Specimens	618	5 00
	Gold Mine Stores	Dry goods	619	5 15
	H. Osborn	Cash advanced	620	38 75
	DeLaval Separator Co.	Rope Belts	621	1 75
	Creamery Package Co.	Dairy Supplies	622	23 66
	Sells & Co.	Feed	623	37 18
	H. A. Coe	Hulling clover seed	624	15 00
	L. L. Hill	Clerical work	625	13 00
	O. V. Brumley	Labor	626	10 00
	H. J. Hammond	"	627	3 62
	H. Braun Sons & Co.	Drugs, etc	628	13 75
	Spahr & Glenn	Paper and printing	629	11 15
	Livingston Seed Co.	Seeds	630	36 05
	Franklin Toil. Sup. Co.	Laundering	631	6 35
	M. L. Seymour	Clerical work	632	3 59
	W. A. Kellerman	Cash advanced	633	15 11
	James Penn	Draying	634	2 75
	L. A. Bowman	Apparatus	635	35 00
	W. E. Case	Labor	636	38 25
	Bourne & Kn'w's Mf. Co.	Gaskets	637	1 88
	J. M. & W. Westwater	Brackets	638	3 50
	Jeffrey Mfg. Co.	Chain and wheels	639	5 00
	Capital City Mach. Wks.	Castings	640	56 49
	Columbus Gas. Co.	Gas	641	80 86
	Sipe & Sigler	Bells	642	2 52
	B. B. Wells	Carpentry	643	15 40
	Hanna Paint Mfg. Co.	Paint	644	2 65
	M. C. Hunter	Labor	645	9 75
	G. M. Berndroth	"	646	12 00
	Wm. Erdman	"	647	8 50
	Hall-Collins Hdw. Co.	Hardware	648	12 05
	W. A. Knight	Cash advanced	649	3 40
	F. E. Sanborn	"	650	2 75
	Columbus Varnish Co.	Alcohol	651	10 30
	W. H. Anderson & Co.	Books	652	22 50
	F. Charles	Draying	653	5 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Oct. 5	Cherrington P. & E. Co.	Stamp and pad	654	$2 75
	W. J. Davidson	Draying	655	50
	T. J. Dundon & Co.	Sawdust	656	3 00
	J. S. Maclean	Lumber	657	11 25
	F. J. Heer	Electrotypes	658	50
	Penna. Fuel Co.	Coal	659	4 40
	P. Hayden S. Hdw. Co.	Hardware	660	50 01
	J. G. Pulling & Co.	Pump parts	661	10 00
	Columbus Gas Co.	Coke	662	14 16
	Chicago L. S. & S. Co.	Balances, etc	663	102 10
	Samuel Butler & Co.	Soap	664	22 50
	Columbus Supply Co.	Supplies	665	201 48
	Rood Lumber Co.	Lumber	666	25 00
	Burrows Bros. Co.	Books	667	240 61
	R. W. Funk	Labor	668	28 58
	F. O. Clements	"	669	8 00
	L. A. Harsh & Co.	Mop wringer pail	670	6 00
	J. S. Schofield	Oil	671	2 50
	Moneypenny-Ham'd. Co.	Sapolio	672	9 00
	Standard Oil Co.	Oil	673	8 74
	Erner & Hopkins	Electrical apparatus	674	4 84
	G. T. Johnson	Toilet paper	675	37 50
	Bucher Eng. Co.	Etching	676	2 00
	C. W. Bryant	Cleaning vaults	677	38 00
	Samuel Smith	Sapolio	678	10 00
	R. I. Fulton	Clock	679	5 00
	Col. Pharmacal Co.	Oint jars	680	35
	J. C. Beard	Lettering	681	3 00
	Nitschke Bros	Rubber bands	682	1 88
	E. H. Moore	Guide service	683	3 12
	J. H. Burgess	"	684	37
	Annis McLaughlin	Work on class records	685	6 82
	H. R. Powell	" " "	686	4 95
	Grace Eagleson	Clerical work	687	4 95
	F. J. Pavlicek	Guide service	688	3 75
	C. C. Wilcox	"	689	3 93
	C. R. Hambleton	"	690	3 83
	F. C. Long	"	691	1 25
	C. F. Johnson	"	692	1 87
	F. C. McKinney	"	693	9 12
	M. Snow	"	694	10 00
	Miller Furniture Co.	Furniture	695	62 95
	Schoedinger, F'rn & Co.	Hardware	696	13 92
	Hasbrook, Barger Co.	Dishes	697	5 90
	F. E. Flescher	Labor	698	6 75
	Eaton Machine Works	Locker parts and drills	699	7 82
	McClelland & Co.	Office supplies	700	19 20
	Bausch & Lomb Opt. Co.	Optical instruments and supplies	701	466 15
	Krauss, Butler & B. Co.	Shades	702	30 00
	Col. Transfer Co.	Use of wagon	703	9 00
	Webb Sta. & Ptg. Co.	Blank books	704	22 50
	U. B. Publishing House	Advertising	705	15 10
	Ohio State Journal Co.	"	706	6 00
	Champlin Printing Co.	Printing	707	255 55
	Murray City Coal Co.	Coal	708	142 99
	H. W. Johns Mfg. Co.	Paints	709	6 88
	Charles Vogel	Labor	710	6 25
	Vogelgesang Furn. Co.	Repairs	711	63 20
	L. Fink	Papering	712	23 00
	W. R. Beattie	Labor	713	8 10

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Oct. 5	J. C. Perry	Labor	714	$10 95
	Kelton & Converse	Lumber	715	269 06
	Central Ohio Paper Co.	Paper	716	114 40
	P. A. Fenstermaker	Painting, etc	717	47 86
	J. W. Cawthorn	Carpentry	718	42 75
	F. Fleischer	Labor	719	8 70
	Col. Paint Mfg. Co.	Paint	720	28 66
	Col. Supply Co.	Hardware	721	247 51
	Col. Wire and Iron Wks.	Wire guards	722	29 40
	Masury, Young & Co.	Oil	723	30 00
	B. D. Potts	Hardware	724	86 50
	Palmer & Beck	Roofing	725	105 11
	Tallmadge Hardw. Co.	Hardware	726	79 21
	E. Doddington & Co.	Lumber	727	280 94
	M. P. Street	Masonry	728	6 75
	J. J. Gheen	Plastering	729	84 15
	E. F. Moore	Labor	730	2 02
	Rilen Masters	Man and team	731	2 40
	A. F. Wilcox	Labor	732	14 25
	W. Morelan	Carpentry	733	9 00
	J. C. Howard	Painting	734	2 55
	J. H. Randall	Carpentry	735	26 75
	J. H. Schaeffer	"	736	39 00
	L. Schaeffer	"	737	17 50
	C. Shaffer	"	738	31 00
	Sheppard & Co.	Printing	739	2 00
	C. N. Mooney	Labor	740	10 50
	W. E. Mann	Labor	741	11 55
	P. F. Yoerger	Painting	742	2 00
	Curts & Jennings	Advertising	743	15 12
	Ruggles-Gale Co	Mounting maps, etc	744	4 70
	Col. P. & W. Glass Co.	Glass	745	3 75
	C. B. Morrey	Platinum crucible	746	12 00
	Tracy-Wells & Co.	Tags	747	11 20
	Hann & Adair	Printing	748	53 14
	Blackwood, Green & Co.	Hardware	749	31 28
	Kimball & Matthews	Photo supplies	750	162 46
	Mallinckrodt Chem. Wks.	Acids	751	124 31
	W. H. Mullins	Castings	752	9 00
	Green, Joyce & Co.	Towels	753	63 00
	H. Troemner	Repairing balances	754	52 75
	Kauffman, Lattimer Co.	Chemical apparatus	755	686 79
	Col. Mill & M. S. Co.	Hardware	756	25 88
	Engelke & Bigelow	Freight and draying	757	49 10
	J. W. Groves	Salary, Sept., 1899	758	50 00
9	L. Weeks	Work in gymnasium	759	5 00
15	C. E. Barnett	Oct. salary, ½ month	760	32 50
12	Sherwood Mfg. Co.	Cleaners and cutters	761	37 24
14	Ohio National Bank	Foreign bill exchange	762	11 35
	Ohio National Bank	" "	763	21 85
	Ohio National Bank	" "	764	59 90
16	L. Weeks	Services as maid	765	5 00
28	W. O. Thompson	Salary, Oct., 1899	766	416 67
	Alexis Cope	" "	767	187 50
	C. E. Steeb	" "	768	37 50
	J. Blackford	" "	769	54 17
	E. D. Cockins	" "	770	58 33
	T. F. Hunt	" "	771	250 00
	G. W. Knight	" "	772	250 00
	W. F. Hunter	" "	773	250 00
	A. M. Bleile	" "	774	225 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Oct. 28	C. N. Brown	Salary, Oct., 1899	775	$225 00
	A. C. Barrows	" "	776	225 00
	R. D. Bohannon	" "	777	225 00
	B. L. Bowen	" "	778	225 00
	S. C. Derby	" "	779	225 00
	J. V. Denney	" "	780	225 00
	E. A. Eggers	" "	781	225 00
	J. P. Gordy	" "	782	225 00
	W. A. Kellerman	" "	783	225 00
	W. R. Lazenby	" "	784	225 00
	Wm. McPherson	" "	785	225 00
	W. T. Magruder	" "	786	225 00
	H. Osborn	" "	787	225 00
	J. R. Smith	" "	788	225 00
	W. H. Scott	" "	789	225 00
	B. F. Thomas	" "	790	225 00
	H. A. Weber	" "	791	225 00
	N. W. Lord	" "	792	200 00
	F. A. Ray	" "	793	200 00
	G. B. Kauffman	" "	794	200 00
	Ed. Orton, Jr.	" "	795	180 00
	J. N. Bradford	" "	796	180 00
	F. E. Sanborn	" "	797	180 00
	H. C. Lord	" "	798	160 00
	F. C. Clark	" "	799	160 00
	G. W. McCoard	" "	800	160 00
	C. P. Linhart	" "	801	160 00
	D. S. White	" "	802	160 00
	F. C. Caldwell	" "	803	160 00
	Ed. Orton	" "	804	150 00
	E. A. Hitchcock	" "	805	150 00
	C. S. Prosser	" "	806	150 00
	W. D. Gibbs	" "	807	160 00
	P. G. Bowen	" "	808	140 00
	W. H. Page	" "	809	140 00
	W. H. Siebert	" "	810	135 00
	O. B. Jones	" "	811	135 00
	S. A. Norton	" "	812	120 00
	E. B. Kinkead	" "	813	120 00
	J. E. Boyd	" "	814	120 00
	H. C. Allen	" "	815	115 00
	C. E. Sherman	" "	816	110 00
	T. E. French	" "	817	110 00
	J. R. Taylor	" "	818	110 00
	C. W. Mesloh	" "	819	110 00
	A. W. Hodgman	" "	820	110 00
	J. H. Schaffner	" "	821	100 00
	W. E. Henderson	" "	822	100 00
	J. A. Bownocker	" "	823	100 00
	W. A. Knight	" "	824	100 00
	C. L. Arnold	" "	825	100 00
	K. D. Swartzel	" "	826	100 00
	C. B. Morrey	" "	827	100 00
	W. L. Graves	" "	828	100 00
	C. A. Bruce	" "	829	100 00
	F. M. Hamilton	" "	830	80 00
	Geo. H. McKnight	" "	831	90 00
	Wm. Renck	" "	832	85 00
	J. S. Hine	" "	833	85 00
	F. L. Landacre	" "	834	85 00
	C. P. Crowe	" "	835	80 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Oct. 28	A. E. Vinson	Salary, Oct., 1899	836	$80 00
	Col. Water Works	Water rents	837	422 66
	F. E. Kester	Salary, Oct., 1899	838	80 00
	Mrs. James Canfield	" "	839	75 00
	E. O. Randall	" "	840	70 00
	D. F. Pugh	" "	841	70 00
	W. A. Landacre	" "	842	70 00
	W. F. Lavery	" "	843	70 00
	C. B. Frederick	" "	844	70 00
	John B. Sanborn	" "	845	70 00
	E. E. Somermeier	" "	846	70 00
	T. K. Lewis	" "	847	60 00
	F. A. Fish	" "	848	60 00
	C. B. Guittard	" "	849	55 00
	H. N. Townshend	" "	850	55 00
	G. S. Kellicott	" "	851	55 00
	Maude D. Jeffrey	" "	852	55 00
	Lucy Allen	" "	853	55 00
	O. V. Brumley	" "	854	50 00
	S. W. Martin	" "	855	50 00
	D. C. Huddleson	" "	856	50 00
	A. V. Bleininger	" "	857	40 00
	J. B. Parker	" "	858	30 00
	M. Dresbach	" "	859	30 00
	F. O. Clements	" "	860	45 00
	H. C. Gore	" "	861	30 00
	J. H. Vosskuehler	" "	862	30 00
	A. H. McIntire	" "	863	30 00
	E. L. Ball	" "	864	30 00
	J. W. Young	" "	865	30 00
	C. A. Grate	" "	866	30 00
	F. J. Hale	" "	867	30 00
	S. W. Collett	" "	868	25 00
	H. W. Brown	" "	869	25 00
	J. H. Collins	" "	870	20 00
	J. A. Shauck	" "	871	17 50
	E. H. Bailey	" "	872	15 00
	R. E. McIntosh	" "	873	12 50
	W. C. McCracken	" "	874	150 00
	E. E. Harrold	" "	875	90 00
	J. P. Covan	" "	876	70 00
	G. R. Rose	" "	877	65 00
	F. Ruhlen	" "	878	60 00
	A. F. Hall	" "	879	60 00
	C. M. Low	" "	880	54 17
	F. K. Luke	" "	881	50 00
	H. C. Price	" "	882	50 00
	W. Standley	" "	883	50 00
	B. LeBay	" "	884	50 00
	T. Boude	" "	885	45 00
	M. Peck	" "	886	40 00
	A. Chantler	" "	887	45 00
	G. A. Goodspeed	" "	888	40 00
	J. H. Brown	" "	889	40 00
	D. D. Geren	" "	890	40 00
	W. W. Whitestine	" "	891	40 00
	H. Chantler	" "	892	40 00
	G. C. Denny	" "	893	40 00
	M. N. Cook	" "	894	40 00
	W. C. Conklin	" "	895	40 00
	T. E. Osborn	" "	896	40 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Oct. 28	W. Townsel	Salary, Oct., 1899	897	$25 00
	J. C. Perry	" "	898	12 50
	J. Garrettson	" "	899	37 50
	B. Irwin	" "	900	45 00
	James Kelly	" "	901	25 00
	Mrs. E. R. Hubler	" "	902	33 33
	W. C. Weir	" "	903	20 00
	A. G. McCall	" "	904	20 00
	W. E. Mann	" "	905	25 00
	H. W. Kennedy	" "	906	30 00
	Wm. Cannan	" "	907	20 00
	W. C. Mills	" "	908	35 00
	Alice Dufour	" "	909	25 00
	Grace Pitts	" "	910	30 00
	C. L. Dowd	" "	911	20 00
	Earl Conway	" "	912	20 00
	N. P. Oglesby	" "	913	40 00
	D. A. Kohr	" "	914	60 00
	J. A. Jeffrey	" "	915	10 00
	J. W. Groves	" "	916	50 00
23	Flint & Wall'g Mfg. Co.	Pipe	917	60 43
	Lily Weeks	Gym. service	918	5 00
24	Mrs. M. J. Kellenberger	5 weeks' service dept. domestic economy	919	25 00
26	Chas. H. Woodruff	Salary, Oct., 1899	920	65 00
Nov. 1	Lily Weeks	Labor	921	5 00
4	R. M. Rownd, P. M.	Postage stamps	922	17 00
5	Lily Weeks	Serv. as jan. gymnasium	923	5 00
10	W. C. Heller & Co.	Steel boxes	924	7 70
	Gregory Electric Co.	Lamps and switches	925	13 90
	Sipe & Sigler	Cells	926	2 77
	Kinkade & Liggett	Wire screens	927	9 40
	Western Electric Co.	Shade and globes	928	2 08
	The Circleville Ice Co.	Ice and refrigeration	929	25 00
	The Ashcroft Mfg. Co.	Guage repairs	930	24 25
	Blackwood, Green & Co.	Tin, tanks, etc	931	30 60
	The P. Hayden Saddlery and Hdw. Co.	Tin and copper	932	53 84
	The G. B. Schulte S. Co.	Steel and shafting	933	19 75
	Wm. Erdman	Student labor	934	17 00
	O. I. Dick	"	935	4 88
	G. M. Berndroth	"	936	32 60
	Hall-Collins Hdw. Co.	Brads, screws, etc	937	11 44
	M. C. Hunter	Student labor	938	10 80
	Col. Forge & Iron Co.	Anvil	939	6 88
	Brown & Sharpe Mf. Co.	Rule, device and hob	940	19 34
	Cleve'd Twist Drill Co.	Drills	941	7 32
	Burr's Damascus T. Co.	Tools	942	19 62
	The Hasbr'k-Bargar Co.	Dishes and supplies	943	2 78
	The Alphea Dairy Co.	Milk and butter	944	2 85
	Logan McCormick	Frames	945	11 90
	J. A. Wallace	Lecture	946	5 00
	Palmer & Beck	Flowerpots	947	20 00
	Glucose Sugar Ref. Co.	Gluten meal	948	42 40
	Champlin Printing Co.	Printing postals	949	5 15
	Sells & Co.	Feed	950	24 53
	Woodard Photo Co.	Slides	951	7 00
	Deering Harvester Co.	Repairs, oil, etc	952	129 37
	Laura L. Hill	Clerical work	953	13 00
	Warren-Southw'k C. Co.	Dairy wagon	954	200 00
	W. H. Hoskins	Advertising	955	17 50

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Nov. 10	R. L. McClelland	Labor	956	$1 25
	D. S. White	Sundries	957	4 75
	A. N. Irwin	Work and supplies	958	28 89
	The Breeders' Gazette	Advertising	959	22 00
	David C. Beggs Co.	Shades	960	5 50
	F. A. Ward	Mounting tiger	961	75 00
	Champlin Printing Co.	Printing	962	9 50
	E. C. Livenspire	Hooks, rings, etc.	963	2 30
	The Griswold, Sohl Co.	Iron and cutting	964	81
	John Bower	Masonry	965	18 00
	Neely & Converse	Work on coal bin	966	29 85
	Kinkade & Liggett	Work on roof	967	6 40
	Louis Lind	Sewer pipe	968	38 35
	M. P. Streett	Brick and labor	969	224 36
	Fitzpatrick & Hoepfner	Plumbing	970	38 46
	J. S. Maclean	Material	971	13 00
	P. Hayden Sad.–H. Co.	Castings, stock, etc.	972	60 67
	Eimer & Amend	Pumps	973	4 61
	F. O. Schoedinger	Roof	974	46 00
	Borger Bros. & Co.	Work on stock	975	24 49
	H. H. Walling	Painting	976	15 50
	J. S. Maclean	Sawdust	977	3 00
	Edgar B. Fox	Superintending building	978	25 00
	Robert Lawson	Door sills	979	3 20
	Arthur Watt	Labor	980	26 66
	Borden & Selleck Co.	Milk scales	981	7 00
	Burrows Bros. Co.	Zeller Aristotle	982	4 68
	Schilling Foundry Co.	Castings	983	44
	Nitschke Bros	Envelopes	984	1 40
	John Lawrence	Generator	985	6 50
	Ziegler Elec. Co.	Balances	986	5 10
	Andrew Spittal	Work in physics dept.	987	69 16
	Lawrence Press Co.	Checks, blanks, etc.	988	1 75
	A. E. Foote	Pyrolusite	989	3 38
	Baker & Co.	Platinum ware	990	149 89
	Hann & Adair	Printing	991	4 55
	The Seraphim B. B. Co.	Books	992	57 00
	Chicago Bl. Pr. Pap. Co.	B. P. paper	993	2 40
	Kimball & Matthews	Photo material	994	8 76
	Kauffman, Lattimer Co.	Drugs and sundries	995	475 00
	Amer. Aristotype Co.	Plates	996	9 75
	Baker & Adamson C. Co.	Chemicals	997	19 85
	Mallinckrodt Chm. Wks.	"	998	209 77
	John Carbutt	Plates	999	35 74
	Chicago L. Sup. & S. Co.	Sundries	1000	54 77
	G. F. Balck Mfg. Co.	Pumps	1001	1,030 00
	H. A. Getz	Floral wreath	1002	20 00
	B. D. Potts	Flange	1003	81
	Col. M. & Mine Sup. Co.	Supplies	1004	268 06
	J. M. & W. Westwater	"	1005	20 00
	R. F. Morse	Guage preserver	1006	3 25
	Elec. Appliance Co.	Supplies	1007	101 00
	Man. Gen. Con. Co.	Bulb and globe	1008	1 25
	Bugbee & Laycock	Crank pin braces	1009	4 40
	Westing El. Mfg. Co.	Switch	1010	15 75
	C. L. Traver	Books and express	1011	2 12
	Journal of C. & C. Bull.	1 copy year book	1012	1 25
	Chas Scribner's Sons	Books	1013	1 73
	W. L. Redrow	Student help	1014	15 15
	L. B. Wing	Trustee expenses	1015	8 00
	U. S. Mort. & Tr. Co.	Bonds due Dec. 1st	1016	25,000 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Nov. 10	U. S. Mort. & Tr. Co..	Interest due Dec. 1st....	1017	$2,812 50
	Clinton National Bank..	" "	1018	1,800 00
	Clinton National Bank..	" "	1019	3,825 00
	Z. L. White.....	Shade	1020	1 10
	Green, Joyce & Co.....	Crash	1021	4 20
	A. M. Bleile.....	Supplies	1022	6 46
	M. C. Lilley & Co.....	Bugles and cord.....	1023	12 00
	Miller Furniture Co....	Chairs tables and tips..	1024	15 39
	Tallmadge Hard. Co....	Glass	1025	7 20
	James Penn	Oats	1026	4 71
	A. C. Barrows.....	Stamp and pad.....	1027	50
	F. C. Clark.....	Envelopes and cards....	1028	1 84
	Library Bureau	Label holders & supports	1029	7 50
	Univ. of Chicago Press.	Pol. Econ. Journal.....	1030	14 04
	Spahr & Glenn.....	Reading statements	1031	1 75
	D. Appleton & Co.....	Spencer's Socialogy.....	1032	32 50
	Burrows Bros. & Co....	Standard Dictionary ...	1033	17 00
	Col. Supply Co.....	Pipe and fittings.....	1034	18 23
	C. K. Leith.....	Collections of rocks....	1035	40 00
	Jas. Penn	Hauling	1036	50
	A. E. Day.....	Work	1037	50
	J. J. Gheen.....	Plastering	1038	33 60
	Hanna Paint Mfg. Co..	Filler and oil.....	1039	3 00
	S. S. Rickley, Treas....	Labor of A. B. Coover..	1040	5 87
	W. C. Mills.....	Supplies	1041	5 04
	B. F. McCarty & Co....	Frogs	1042	6 00
	Orvis & Marshall.....	Spacer and paper.....	1043	3 00
	J. S. Hine.....	Department supplies ...	1044	9 95
	G. V. Bailey.....	Mounting skeleton	1045	14 00
	F. J. Tyler.....	Lab. work	1046	2 25
	Payne-McD. Hdw. Co..	Supplies	1047	18 07
	H. H. & C. S. Brinkey..	Department supplies ...	1048	5 08
	A. W. Livingston's Sons	Pots	1049	17 10
	O. E. Jennings.....	Labor	1050	4 50
	Kimball & Matthews....	Repairs, etc.....	1051	2 20
	N. M. Glatfelter.....	Herbarium specimens ..	1052	5 50
	C. O. Paper Co.....	Paper	1053	4 66
	Edna Armstrong.....	Work on herbarium....	1054	1 50
	Hann & Adair.....	Envelopes and papers..	1055	8 50
	Payne-McD. Hdw. Co.	Bot. dept. supplies.....	1056	11 22
	J. Wanamaker	Books	1057	24 10
	W. H. Mears.....	Labor	1058	2 34
	F. W. Arnold.....	"	1059	2 50
	H. Mesloh	"	1060	2 28
	O. D. Clark.....	"	1061	3 91
	C. L. Wottring.....	"	1062	6 65
	Ira McKinley	"	1063	5 43
	A. F. Wilcox.....	"	1064	44 00
	F. W. Nelson.....	"	1065	2 59
	Krauss, Butler & B. Co.	Linoleum	1066	30 00
	M. Rice	Work	1067	4 00
	M. Huddleson.....	"	1068	10 00
	Mason Snow	"	1069	12 32
	Robt. Clarke Co.....	Book	1070	2 60
	Burrows Bros. Co.....	Books library	1071	136 21
	G. E. Stechert.....	"	1072	135 48
	J. W. Shaw.....	Labor	1073	11 46
	Library Bureau	Cards, boxes, etc.....	1074	33 43
	Boston Book Co.....	Books	1075	100 00
	S. A. Norton.....	Chemical works	1076	22 00
	S. N. Young.....	Work in law library....	1077	9 20

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Nov. 10	Seraphim Blank. B. Co.	Binding	1078	$22 30
	Spahr & Glenn	Printing	1079	9 25
	The H. Cole Co	Thumb tacks	1080	1 10
	A. H. Smythe	Files	1081	2 50
	R. L. Babb	Year book	1982	5 00
	Orvis & Marshall	Ribbon paper	1083	2 75
	Miller's Fair	Hooks	1084	75
	Col. Mdse. Co	Erasers	1085	9 00
	Jas. Penn	Hauling	1086	5 30
	T. J. O'Neil	Rent of canvas	1087	4 50
	C. F. Slyh, Supt	Vault cleaning	1088	10 60
	Spahr & Glenn	Envelopes	1089	2 25
	Geo. Roth	Guide	1090	2 00
	F. C. Long	"	1091	3 00
	W. U. Telegraph Co	Telegrams	1092	5 65
	W. G. Wallace	Guide	1093	3 25
	Tracy Wells Co	Sundries	1094	28 00
	Mrs. F. D. Myers	Washing towels	1095	4 75
	Amer. Dist. Tel. Co	Night watch boxes	1096	27 00
	Green, Joyce & Co	Ribbon	1097	4 68
	Standard Oil Co	Oils	1098	34 42
	Nitschke Bros	Printing	1099	35 67
	C. U. Telephone Co	Service	1100	69 68
	Nitschke Bros	Wrapping paper	1101	28 00
	Z. L. White & Co	Ribbon	1102	4 80
	Chas. Lowe	Night watch	1103	1 50
	M. C. Lilley & Co	Repairs flag	1104	1 25
	E. L. Orndorff	Guide	1105	4 25
	F. C. McKinney	"	1106	5 75
	C. H. Woodruff	Labor	1107	6 50
	C. M. & W. Westwater	Globes	1108	50
	Agric. Students P. Co	Advertising	1109	80 00
	Shaw Walker Co	Desk boxes	1110	4 30
	Cent. O. Paper Co	Brands, etc	1111	3 61
	E. G. Soltman	Drawing tables	1112	22 50
	Schilling Foundry Co	C. iron	1113	1 80
	Franklin Toilet Sup. Co.	Towels, etc	1114	2 50
	The Bristol Co	Charts	1115	1 17
	Crosby St. G. & V. Co.	Repairs	1116	1 00
	Hohmann, M. Mfg. Co.	Flue, etc	1117	26 25
	Cols. Machine Co	Chemicals	1118	3 15
	S. W. Smith	Office chair	1119	3 75
	E. G. Bailey	Labor	1120	14 38
	F. J. Hale	Lab. work	1121	2 40
	W. T. Magruder	Telegram	1122	50
	Nitschke Bros	Ink	1123	50
	McClellan & Co	Stencil	1124	1 05
	Col. Supply Co	Packing	1125	7 50
	C. U. Telephone Co	Telephone service	1126	90
	M. L. Seymour	Clerical work	1127	6 00
	Domestic Laundry	Laundering	1128	30 00
	J. C. Porterfield	Basket balls	1129	12 50
	A. G. Spaulding & Bros.	Lunger	1130	2 10
	Cols. Wire & Iron Wks.	Guards and rods	1131	6 50
	Wm. Taylor M. & G. Co.	Lumber, etc	1132	521 97
	Keasbey & Mattison	Magnabestos covering	1133	40 00
	Flint & Walling Mf. Co.	Pipe	1134	24 46
	M. P. Streett	Masonry	1135	12 50
	Col. Sewer Pipe Co	Pipe	1136	11 55
	James LeRoy	Labor	1137	13 65
	The Fish Stone Co	Stone	1138	9 18

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Nov. 10	Fred Fleischer	Stone	1139	$13 65
	Eaton Machine Works	Cable, etc	1140	31 88
	Harry Kinnear	Wiring	1141	3 60
	Krauss, Butler & B. Co.	Shades	1142	19 90
	Tallmadge Hardware Co.	Supplies	1143	33 38
	Charles W. Herb	Letter files	1144	15 50
	Engelke & Bigelow	Drayage and freight	1145	79 61
	C. E. Stechert	Books	1146	3 40
	Luth. Book Concern	Binding	1147	2 25
	Osborn, Wil'ms & Horn	Coal	1148	23 42
	Col. M. & Mine Sup. Co.	Supplies	1149	15 56
	Murray City Coal Co.	Coal	1150	683 12
	H. Braun Sons & Co.	Sundries	1151	10 38
	J. H. Randall	Carpenter work	1152	27 00
	Columbus Brass Co.	Goose-necks, etc.	1153	6 27
	J. C. Howard	Painting	1154	90 75
	Columbus Supply Co.	Supplies	1155	51 23
	Champlin Printing Co.	Printing	1156	124 25
	Erner & Hopkins	Supplies	1157	17 78
	Vogelgesang Furn. Co.	Register and chim top	1158	59 00
	Cap. City Mach. Wks.	Supplies	1159	8 93
	E. Doddington & Co.	Lumber	1160	80 13
	Hann & Adair	Sundries	1161	22 62
	Schoedinger, F'rn & Co.	"	1162	14 29
	Kelton & Converse	Lumber	1163	198 76
	J. S. Abbott & Co.	Hardware	1164	39 59
	Blackwood, Green & Co.	"	1165	18 37
	Wm. Burdell, Jr.	Hames, etc.	1166	45 50
	Bausch & Lomb Opt. Co.	Microscopes, etc.	1167	167 93
	J. W. Cawthon	Carpentry	1168	20 25
	A. F. Wilcox	"	1169	12 50
	Wilbert Morelan	"	1170	13 25
	Louis Schaffer	"	1171	19 50
	Clinton Schaffer	"	1172	21 25
	M. D. Geary	"	1173	12 50
	W. H. Waters	Labor	1174	36 00
	Columbus Gas Co.	Gas	1175	130 12
13	John T. Mack	Expense	1176	31 30
	Lily Weeks	Gym. work	1177	5 00
16	C. H. E. Moore	Reading math. papers	1178	5 00
	Mrs. Anna D. Orton	Salary Dr. Orton, Nov-Dec., 1899	1179	300 00
	E. O. Fippin	Military services	1180	50 00
17	D. M. Massie	Expenses as trustee	1181	40 22
	Ohio National Bank	Bill Exc. order I. Hayez	1182	5 00
18	Ohio National Bank	Same to ord .L. Stender	1183	20 10
20	Bannon & Bannon	Printing brief, O. S. U. vs. Cuppett & Webb	1184	25 90
25	W. O. Thompson	Salary, Nov., 1899	1185	416 67
22	Alex. Cope	" "	1186	187 50
21	Carl E. Steeb	" "	1187	50 00
25	Katherine Duncan	" "	1188	50 00
	Edith D. Cockins	" "	1189	58 33
	T. F. Hunt	" "	1190	250 00
	Geo. W. Knight	" "	1191	250 00
	W. F. Hunter	" "	1192	250 00
	A. M. Bleile	" "	1193	225 00
	C. N. Brown	" "	1194	225 00
	A. C. Barrows	" "	1195	225 00
	R. D. Bohannon	" "	1196	225 00
	B. L. Bowen	" "	1197	225 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Nov. 25	S. C. Derby	Salary, Nov., 1899	1198	$225 00
	J. V. Denney	" " "	1199	225 00
	E. A. Eggers	" " "	1200	225 00
	J. P. Gordy	" " "	1201	225 00
	W. A. Kellerman	" " "	1202	225 00
	W. R. Lazenby	" " "	1203	225 00
	Wm. McPherson	" " "	1204	225 00
	W. T. Magruder	" " "	1205	225 00
	H. Osborn	" " "	1206	225 00
	J. R. Smith	" " "	1207	225 00
	W. H. Scott	" " "	1208	225 00
	B. F. Thomas	" " "	1209	225 00
	H. A. Weber	" " "	1210	225 00
	N. W. Lord	" " "	1211	200 00
	Frank A. Ray	" " "	1212	200 00
	G. B. Kauffman	" " "	1213	200 00
	Edward Orton, Jr	" " "	1214	180 00
	J. N. Bradford	" " "	1215	180 00
	F. E. Sanborn	" " "	1216	200 00
	H. C. Lord	" " "	1217	160 00
	F. C. Clark	" " "	1218	160 00
	G. W. McCoard	" " "	1219	160 00
	C. P. Linhart	" " "	1220	160 00
	D. S. White	" " "	1221	160 00
	F. C. Caldwell	" " "	1222	160 00
	E. A. Hitchcock	" " "	1223	150 00
	C. S. Prosser	" " "	1224	150 00
	W. D. Gibbs	" " "	1225	160 00
	P. G. Bowman	" " "	1226	140 00
	W. H. Page	" " "	1227	140 00
	W. H. Siebert	" " "	1228	135 00
	O. B. Jones	" " "	1229	135 00
	S. A. Norton	" " "	1230	120 00
	E. B. Kinkead	" " "	1231	120 00
	James E. Boyd	" " "	1232	120 00
	H. C. Allen	" " "	1233	115 00
	C. E. Sherman	" " "	1234	110 00
	J. R. Taylor	" " "	1235	110 00
	T. E. French	" " "	1236	110 00
	C. W. Mesloh	" " "	1237	110 00
	A. W. Hodgman	" " "	1238	110 00
	J. H. Schaffner	" " "	1239	100 00
	W. E. Henderson	" " "	1240	100 00
	J. A. Bownocker	" " "	1241	100 00
	W. A. Knight	" " "	1242	100 00
	C. L. Arnold	" " "	1243	100 00
	K. D. Swartzel	" " "	1244	100 00
	C. B. Morrey	" " "	1245	100 00
	W. L. Graves	" " "	1246	100 00
	C. A. Bruce	" " "	1247	100 00
	F. M. Hamilton	" " "	1248	80 00
	G. H. McKnight	" " "	1249	90 00
	Wm. Renck	" " "	1250	85 00
	J. S. Hine	" " "	1251	85 00
	F. L. Landacre	" " "	1252	85 00
	C. P. Crowe	" " "	1253	80 00
	A. E. Vinson	" " "	1254	80 00
	F. E. Kester	" " "	1255	80 00
	S. E. Canfield	" " "	1256	75 00
	E. O. Randall	" " "	1257	70 00
	D. F. Pugh	" " "	1258	95 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Nov. 25	W. A. Landacre	Salary, Nov., 1899	1259	$70 00
	W. F. Lavery	" "	1260	70 00
	C. B. Frederick	" "	1261	70 00
	J. B. Sanborn	" "	1262	70 00
	E. E. Somermeier	" "	1263	70 00
	T. K. Lewis	" "	1264	60 00
	F. A. Fish	" "	1265	60 00
	C. B. Guittard	" "	1266	55 00
	H. N. Townshend	" "	1267	55 00
	G. Kellicott	" "	1268	55 00
	Maude Jeffrey	" "	1269	55 00
	Lucy Allen	" "	1270	55 00
	O. V. Brumley	" "	1271	50 00
	S. W. Martin	" "	1272	50 00
	D. C. Huddleson	" "	1273	50 00
	A. V. Bleininger	" "	1274	40 00
	J. B. Parker	" "	1275	30 00
	M. Dresbach	" "	1276	30 00
	F. O. Clements	" "	1277	45 00
	H. C. Gore	" "	1278	30 00
	J. H. Vosskuehler	" "	1279	30 00
	A. H. McIntire	" "	1280	30 00
	E. L. Ball	" "	1281	30 00
	Lily Weeks	Gym. services	1282	5 00
	J. W. Young	Salary, Nov., 1899	1283	30 00
	C. A. Grate	" "	1284	30 00
	F. J. Hale	" "	1285	30 00
	S. W. Collett	" "	1286	25 00
	H. W. Brown	" "	1287	25 00
	J. H. Collins	" "	1288	20 00
	J. A. Shauck	" "	1289	17 50
	E. H. Bailey	" "	1290	15 00
	R. E. McIntosh	" "	1291	12 50
	W. C. McCracken	" "	1292	150 00
	E. E. Harrold	" "	1293	90 00
	J. P. Covan	" "	1294	70 00
	G. R. Rose	" "	1295	65 00
	F. Ruhlen	" "	1296	60 00
	A. F. Hall	" "	1297	60 00
	C. M. Low	" "	1298	54 17
	F. K. Luke	" "	1299	50 00
	H. C. Price	" "	1300	50 00
	W. Standley	" "	1301	50 00
	B. LeBay	" "	1302	50 00
	T. Boude	" "	1303	45 00
	W. H. Case	" "	1304	45 00
	M. Peck	" "	1305	40 00
	A. Chantler	" "	1306	45 00
	G. A. Goodspeed	" "	1307	40 00
	J. H. Brown	" "	1308	40 00
	D. D. Geren	" "	1309	40 00
	W. Whitestine	" "	1310	40 00
	H. Chantler	" "	1311	40 00
	G. C. Denney	" "	1312	40 00
	M. N. Cook	" "	1313	40 00
	W. C. Conklin	" "	1314	40 00
	T. E. Osburn	" "	1315	40 00
	W. Townsel	" "	1316	25 00
	J. C. Perry	" "	1317	12 50
	Joe. Garretson	" "	1318	37 50
	B. I. Irwin	" "	1319	45 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Nov. 25	James Kelly	Salary, Nov., 1899	1320	$25 00
	E. R. Hubler	" "	1321	33 33
	W. C. Weir	" "	1322	20 00
	A. G. McCall	" "	1323	20 00
	H. W. Kennedy	" "	1324	30 00
	W. E. Mann	" "	1325	25 00
	W. Cannan	" "	1326	20 00
	W. C. Mills	" "	1327	35 00
	Alice Dufour	" "	1328	25 00
	G. L. Pitts	" "	1329	30 00
	C. F. Dowd	" "	1330	20 00
	E. Conway	" "	1331	20 00
	E. H. Moore	" "	1332	60 00
	N. P. Oglesby	" "	1333	40 00
	D. A. Kohr	" "	1334	60 00
	J. F. Jeffrey	" "	1335	10 00
	J. W. Groves	" "	1336	50 00
	C. L. E. Moore	" "	1337	10 00
	G. V. Bailey	Work	1338	32 00
Dec. 1	Mrs. M. P. Kellenberger	Serv. dom. econ	1339	20 00
Nov. 27	T. C. Mendenhall	Exp. Orton Mem. Serv.	1340	51 50
	G. K. Gilbert	" " "	1341	34 50
	C. H. Woodruff	Carpentry	1342	65 00
	T. J. Godfrey	Expenses as trustee	1343	35 25
	Lily Weeks	Gym. services	1344	5 00
28	Kate Shanahan	Laundry	1345	25 00
	R. M. Rownd, P. M.	Postage stamps	1346	18 00
Dec. 1	Clinton Nat. Bank	Paymt. certfs. indebt.	1347	30,000 00
	D. F. Pugh	Adv. in Oct., salary	1348	20 00
2	Ohio Nat. Bank	Bill of exchange	1349	564 04
1	J. McLain Smith	Expenses as trustee	1350	7 35
5	Col. Gas Co.	Gas	1351	139 80
	Lily Weeks	Gym. services	1352	3 00
6	R. M. Rownd, P. M.	Stamps	1353	10 00
	G. Bruder	Band instruction	1354	26 00
	W. F. Hunter	Stamps	1355	3 50
9	F. C. Clark	Office supples	1356	1 95
	H. Powell	Clerical work	1357	10 00
	Mason Snow	Work in library	1358	8 60
	J. W. Shaw	" "	1359	8 95
	S. N. Young	" "	1360	9 05
	Mabel Rice	" "	1361	2 75
	Mabel Huddleson	" "	1362	10 50
	F. Fleischer	Wheeling coal	1363	40 50
	H. Kinnear	Wiring	1364	10 80
	A. M. Irwin	Campus work	1365	1 21
	N. A. Burgess	"	1366	2 87
	F. W. Nelson	"	1367	1 68
	Ira McKinley	"	1368	1 12
	N. L. Seymour	Clerical work	1369	6 37
	F. J. Hale	Lab. work	1370	3 10
	G. G. Leinbaugh	Work	1371	1 35
	E. G. Bailey	Pipe fitting, etc	1372	14 00
	E. H. Bailey	"	1373	4 05
	W. F. Magruder	Tel. work	1374	1 45
	W. L. Redrow	Student work	1375	3 30
	R. W. Funk	Labor in store room	1376	27 15
	J. H. Nold	Work	1377	1 50
	K. H. Duncan	St. car t'ck'ts for guides	1378	5 00
	W. R. Lazenby	R. R. ticket to London	1379	6 00
	W. G. Wallace	Guide	1380	4 75

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Dec. 9	R. Thompson	Guide	1381	$4 38
	E. L. Orndorff	"	1382	4 13
	F. C. McKinney	"	1383	3 38
	F. C. Long	"	1384	3 50
	W. D. Gibbs	Advertising	1385	6 00
	R. E. McIntosh	Labor	1386	9 70
	G. G. Linebaugh	"	1387	6 83
	F. J. Tyler	"	1388	2 25
	G. V. Bailey	"	1389	12 00
	A. S. Watts	"	1390	29 25
	Andrew Spittal	Labor in physics dept.	1391	51 81
	H. J. Hammond	" " "	1392	7 26
	Laura L. Hill	Clerical work	1393	13 00
	Wm. Erdman	Student labor	1394	6 00
	M. C. Hunter	"	1395	11 70
	G. M. Berndroth	"	1396	24 00
	M. L. Seymour	Clerical work botany	1397	14 23
	B. LeBay	Work	1398	34 50
	W. Watters	Labor in trench	1399	34 50
	S. E. Canfield	Supplies	1400	3 00
	M. D. Geary	Carpenter work	1401	20 75
	W. Morelan	"	1402	12 75
	J. W. Cawthon	"	1403	19 75
	A. F. Wilcox	"	1404	24 75
	J. H. Randall	"	1405	32 75
	Col. Brass Co	Supplies	1406	9 15
	W. Burdell	Repair medicine balls	1407	3 00
	Col. Mill & Mine S. Co.	Pipe and supplies	1408	47 32
	Baker & Adamson C. Co.	Supplies	1409	33 47
	Kimball & Matthews	"	1410	5 59
	Chgo. Blue P. Paper Co.	Blue print paper	1411	5 60
	Bausch & Lomb Opt. Co.	Supplies	1412	24 03
	Amer. Aristotype Co.	"	1413	9 24
	Chic. Lab. Sup. Co.	"	1414	95 40
	Kauffman-Lattimer Co.	Drugs and Sundries	1415	168 88
	Acme Paving Co	Cementing bath room	1416	28 65
	Wolfram Guitar Co.	Piano rent	1417	7 50
	McAllister, Moh. & Co.	Two stands	1418	2 00
	Domestic Laundry	Towels for November	1419	28 25
	Burrows Bros. Co.	Books, etc	1420	73 45
	Seraphim Book Bdg. Co.	Binding	1421	14 60
	C. of B. of E. N. Dept.	Nautical almanac	1422	3 00
	N. P. Hyndeman	Map Pgh. coal region	1423	4 00
	H. Braun Sons & Co.	Supplies	1424	22 75
	Spahr & Glenn	Printing	1425	45 00
	Engelke & Bigelow	Freight and cartage	1426	37 55
	Krauss, Butler & B. Co.	Shades	1427	19 00
	Cherington P. & E. Co.	Stamps	1428	75
	Nitschke Bros	Printing, etc	1429	13 00
	E. Doddington & Co.	Lumber, etc	1430	127 80
	Hann & Adair	Printing	1431	30 94
	Champlin Printing Co.	"	1432	64 75
	Tallmadge Hdw. Co.	Supplies	1433	34 40
	G. E. Stechert	Books	1434	85 02
	M. C. Lilley & Co.	Supplies	1435	73 50
	J. M. & W. Westwater	"	1436	77 10
	W. U. Tel. Co.	Telegrams	1437	2 11
	A. S. W. Huffman	Supplies	1438	27 82
	Erner & Hopkins	"	1439	20 72
	R. A. McClure	Stakes	1440	6 25
	H. Haerlein	Profess. services	1441	47 60

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Dec. 9	Reserve Cons. Co.....	1000 bricks.....	1442	$7 50
	Electric Appl. Co.....	Supplies	1443	48 70
	Fultonham B. & Tile Co.	Brick	1444	138 00
	E. C. Niederlander.....	Painting signs	1445	4 20
	W. D. Gibbs.....	Drayage, etc.....	1446	60
	Gus. C. Henning.....	Pocket recorder	1447	112 50
	Crosby St. G. & V. Co.	Steam fittings	1448	29 10
	G. H. Barnes.....	Calorimeter connections	1449	5 00
	Alpha Dairy Co.....	Milk tickets	1450	2 56
	Lawton & Co.....	Paper and inks.....	1451	6 50
	Hager & Graves.....	Groceries	1452	38 99
	Col. Gas Co.....	Welsbach lights	1453	1 50
	Eimer & Amend.....	Chart, stopples, etc.....	1454	17 46
	Gardiner M. Lane.....	Book	1455	3 48
	Charles W. Harper.....	Adv. cuts	1456	8 05
	Kelton & Converse.....	Lumber	1457	2 70
	McClelland & Co.....	Supplies	1458	10 65
	Richmond Chair Co....	Chairs	1459	75 00
	Col. Wire and Iron Wks.	Mats	1460	10 50
	Strobridge Litho. Co...	Commissions & warrants	1461	35 00
	Moneypenny–Ham'd. Co.	500 Bull	1462	4 50
	Orvis & Marshall.....	Carbon paper	1463	3 00
	Webb. Sta. & Ptg. Co..	Office supplies	1464	13 35
	Masury, Young & Co...	Cyl. oil	1465	18 03
	L. Hirsch, Prest.....	Adv. in German paper.	1466	16 00
	Stumpf & Steurer.....	Advertising	1467	32 00
	Lawrence Pub. Co.....	"	1468	192 78
	O. S. Journal Co.....	"	1469	15 00
	Schoedinger, F'rn & Co.	Screws and washers.....	1470	40
	Oscar S. Lear.....	Paper and ink.....	1471	4 00
	Elec. Sup. & Cons. Co..	Wire	1472	2 84
	F. G. Howall & Co.....	Rollers	1473	50
	Z. L. White & Co.....	Cheese cloth	1474	1 00
	Cap. City Mchn. Works.	Supplies	1475	38 50
	Osborn, Will's & Horn.	Coal	1476	31 42
	Murray City Coal Co...	"	1477	485 93
	C. L. Wottring.....	Manure	1478	19 50
	The Macmillan Co.....	Bonar Malthus	1479	3 19
	Charles Dury	Expense sea lion skins..	1480	15 00
	J. C. Pugh.....	Mounting charts	1481	11 00
	Riddle & Son.....	Cans and repairs.....	1482	6 15
	Columbus Gas Co.....	Coke	1483	9 62
	Col. Tent & Awning Co.	Strainers	1484	7 20
	Haussmann & Dunn....	Instruments	1485	18 00
	Sells & Co.....	Feed	1486	20 75
	Pitz Bros	Two tons shorts.....	1487	28 00
	Glucose Sugar Ref. Co.	Gluten meal	1488	84 00
	Blackwood, Green & Co.	Repairs and supplies....	1489	8 17
	Creamery Pkg, Mfg. Co.	Jars, brushes, etc.....	1490	51 63
	R. M. Ramsey.....	1 box Lenox soap.....	1491	3 25
	Wm. Burdell, Jr.....	Pipe, repairs, etc.....	1492	89 02
	W. H. Anderson & Co..	Mass. and N. Y. Reports	1493	4 75
	James Ohlen Sons & Co.	27 foot steel.....	1494	6 75
	G. G. Quincy & Co.....	Sheeting	1495	4 00
	The L. S. Starrett Co..	Supplies	1496	12 90
	The Jeffrey Mfg. Co....	Shafting, etc.....	1497	53 21
	Nicholson File Co.....	Files	1498	20 80
	Cincinnati S. & T. Co..	Bolts, nuts, etc.....	1499	34 61
	Yost & Packard.....	Services as architects....	1500	35 00
	J. S. Abbott & Co.....	Supplies	1501	13 69
	Batterson Decorative Co.	Working in house.....	1502	41 35

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Dec. 9	J. J. Gheen	Plastering	1503	$3 60
	J. C. Howard	Painting	1504	95 00
	Hanna Paint Mfg. Co.	1 gallon golden gloss	1505	3 50
	C. T. Phillips	Papering etc	1506	26 15
	Col. Supply Co	Supplies	1507	42 43
	Lily Weeks	Gym. work	1508	5 00
	M. J. Kellenberger	Work	1509	25 00
	Thos. F. Hunt	Salary Dec. 1899	1510	250 00
16	W. O. Thompson	" "	1511	416 67
	Alexis Cope	" "	1512	187 50
	Carl E. Steeb	" "	1513	50 00
	Katherine Duncan	" "	1514	54 17
	G. W. Knight	" "	1515	250 00
	W. F. Hunter	" "	1516	250 00
	A. M. Bleile	" "	1517	225 00
	C. N. Brown	" "	1518	225 00
	A. C. Barrows	" "	1519	225 00
	R. D. Bohannon	" "	1520	225 00
	B. L. Bowen	" "	1521	225 00
	S. C. Derby	" "	1522	225 00
	J. V. Denney	" "	1523	225 00
	E. A. Eggers	" "	1524	225 00
	J. P. Gordy	" "	1525	225 00
	W. A. Kellerman	" "	1526	225 00
	W. R. Lazenby	" "	1527	225 00
	Wm. McPherson	" "	1528	225 00
	W. F. Magruder	" "	1529	225 00
	H. Osborn	" "	1530	225 00
	J. R. Smith	" "	1531	225 00
	W. H. Scott	" "	1532	225 00
	B. F. Thomas	" "	1533	225 00
	H. A. Weber	" "	1534	225 00
	N. W. Lord	" "	1535	200 00
	F. A. Ray	" "	1536	200 00
	G. B. Kauffman	" "	1537	200 00
	Edward Orton	" "	1538	180 00
	J. N. Bradford	" "	1539	180 00
	F. E. Sanborn	Sal., bal. of Sept–Oct.	1540	240 00
	H. C. Lord	Salary, Dec., 1899	1541	160 00
	F. C. Clark	" "	1542	160 00
	G. W. McCoard	" "	1543	160 00
	C. P. Linhart	" "	1544	160 00
	D. S. White	" "	1545	160 00
	F. C. Caldwell	" "	1546	160 00
	E. A. Hitchcock	" "	1547	150 00
	C. S. Prosser	" "	1548	150 00
	W. D. Gibbs	" "	1549	160 00
	P. G. Bowman	" "	1550	140 00
	W. H. Page	" "	1551	140 00
	W. H. Siebert	" "	1552	135 00
	S. A. Norton	" "	1553	120 00
	E. B. Kinkead	" "	1154	120 00
	J. E. Boyd	" "	1555	120 00
	H. C. Allen	" "	1556	115 00
	C. E. Sherman	" "	1557	110 00
	T. E. French	" "	1558	110 00
	J. R. Taylor	" "	1559	110 00
	C. W. Mesloh	" "	1560	110 00
	A. W. Hodgman	" "	1561	110 00
	J. H. Schaffner	" "	1562	100 00
	W. E. Henderson	" "	1563	100 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1899				
Dec. 16	J. A. Bownocker	Salary, Dec., 1899	1564	$100 00
	W. A. Knight	" "	1565	100 00
	C. L. Arnold	" "	1566	100 00
	K. D. Swartzel	" "	1567	100 00
	C. B. Morrey	" "	1568	100 00
	W. L. Graves	" "	1569	100 00
	C. A. Bruce	" "	1570	100 00
	F. M. Hamilton	" "	1571	80 00
	G. H. McKnight	" "	1572	90 00
	Wm. Renck	" "	1573	85 00
	J. S. Hine	" "	1574	85 00
	F. L. Landacre	" "	1575	85 00
	C. P. Crowe	" "	1576	80 00
	A. E. Vinson	" "	1577	80 00
	F. E. Kester	" "	1578	80 00
	S. E. Canfield	" "	1579	75 00
	E. O. Randall	" "	1580	70 00
	D. F. Pugh	" "	1581	95 00
	W. F. Lavery	" "	1582	70 00
	C. B. Frederick	" "	1583	70 00
	J. B. Sanborn	" "	1584	70 00
	E. E. Somermeier	" "	1585	70 00
	T. K. Lewis	" "	1586	60 00
	F. A. Fish	" "	1587	60 00
	O. V. Brumley	" "	1588	50 00
	Silas Martin	" "	1589	50 00
	A. V. Bleininger	" "	1590	40 00
	J. B. Parker	" "	1591	30 00
	M. Dresbach	" "	1592	30 00
	D. A. Kohr	" "	1593	60 00
	H. C. Gore	" "	1594	30 00
	J. H. Vosskuehler	" "	1595	30 00
	A. H. McIntire	" "	1596	30 00
	E. L. Ball	" "	1597	30 00
	J. W. Young	" "	1598	30 00
	F. J. Hale	" "	1599	30 00
	H. W. Brown	" "	1600	25 00
	S. W. Collett	" "	1601	25 00
	J. H. Collins	" "	1602	20 00
	J. A. Shauck	" "	1603	17 50
	E. H. Bailey	" "	1604	15 00
	R. E. McIntosh	" "	1605	12 50
	W. C. McCracken	" "	1606	150 00
	O. B. Jones	" "	1607	135 00
	E. E. Harold	" "	1608	90 00
	J. P. Covan	" "	1609	70 00
	G. R. Rose	" "	1610	65 00
	F. Ruhlen	" "	1611	60 00
	A. F. Hall	" "	1612	60 00
	E. D. Cockins	" "	1613	58 33
	C. B. Guittard	" "	1614	55 00
	H. N. Townshend	" "	1615	55 00
	G. Kellicott	" "	1616	55 00
	M. D. Jeffrey	" "	1617	55 00
	Lucy Allen	" "	1618	55 00
	C. M. Low	" "	1619	54 17
	F. K. Luke	" "	1620	50 00
	W. Standley	" "	1621	50 00
	B. LeBay	" "	1622	50 00
	D. C. Huddleson	" "	1623	50 00
	T. Boude	" "	1624	45 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Dec. 16	W. H. Case	Salary, Dec., 1899	1625	$45 00
	M. Peck	" "	1626	40 00
	A. Chantler	" "	1627	45 00
	G. A. Goodspeed	" "	1628	40 00
	J. H. Brown	" "	1629	40 00
	D. D. Geren	" "	1630	40 00
	W. Whitestine	" "	1631	40 00
	H. Chantler	" "	1632	40 00
	G. C. Denny	" "	1633	40 00
	M. N. Cook	" "	1634	40 00
	T. E. Osburn	" "	1635	40 00
	W. Townsel	" "	1636	25 00
	J. Garrettson	" "	1637	37 39
	E. R. Hubler	" "	1638	33 33
	James Kelley	" "	1639	25 00
	W. C. Weir	" "	1640	20 00
	J. D. Decker	" "	1641	140 00
	Alice Dufour	" "	1642	25 00
	J. F. Jeffrey	" "	1643	10 00
	J. W. Groves	" "	1644	50 00
	Wm. Cannan	" "	1645	20 00
	W. E. Mann	" "	1646	25 00
	Grace Pitts	" "	1647	30 00
	W. C. Mills	" "	1648	35 00
	E. H. Moore	" "	1649	20 00
	F. O. Clements	" "	1650	45 00
	H. C. Price	" "	1651	60 00
	C. L. E. Moore	" "	1652	10 00
	C. A. Grate	" "	1653	30 00
	W. A. Landacre	" "	1654	70 00
	N. P. Oglesby	" "	1655	40 00
	C. F. Dowd	" "	1656	20 00
	Benj. Irwin	" "	1657	45 00
	J. C. Perry	" "	1658	12 50
	A. G. McCall	" "	1659	20 00
	W. Conklin	" "	1660	40 00
	Earl Conway	" "	1661	20 00
	C. H. Woodruff	" "	1662	65 00
15	Helen Potts	Accp. in gym	1663	5 50
	Edith Seymour	" "	1664	3 00
	Lily Weeks	Gym. work	1665	5 00
1900				
Jan. 5	Col. Gas Co.	Gas for December	1666	136 42
	Wm. Cannan	Fee and store room	1667	12 50
	Lily Weeks	Salary, one week	1668	5 00
	R. M. Rownd, P. M.	Stamped envelopes	1669	85 60
	Frank C. White	Return fees, pro rata	1670	5 00
	C. R. Monsarrat	Fees C. H. Evans	1671	5 00
	Edna Luse	Return of fees	1672	5 00
	Daniel C. Keller	" "	1673	8 00
	Blanche Powell	" "	1674	5 00
	E. D. Easton	" "	1675	7 00
	Mary E. Dow	" "	1676	6 00
	Morton Farrar	" "	1677	9 75
	Engelke & Bigelow	Freight and drayage	1678	62 72
	Murray City Coal Co.	Coal	1679	950 56
	Osborn, Will's & Horn.	"	1680	57 42
	H. J. Hammond	Hospital supplies	1681	15 97
	C. B. Frederick	Anatomy horses	1682	38 50
	Fred Fleischer	Hauling coal	1683	39 00
	J. S. Abbott & Co.	Glass, putty, etc.	1684	49 03

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Dec. 5	E. Doddington & Co...	Lumber, etc.....	1685	$34 52
	S. T. Hallsman.....	Labor	1686	6 30
	A. F. Wilcox.....	"	1687	20 75
	Wilbert Morelan	Carpenter work	1688	19 00
	E. J. Barton.....	" "	1689	16 50
	J. H. Randall.....	" "	1690	30 75
	The Tallmadge Hdw. Co.	Hardware, etc.....	1691	20 13
	Kelton & Converse.....	Lumber	1692	7 00
	Yale & Towne Mfg. Co.	Locks and keys.....	1693	2 45
	The Fish Stone Co.....	One sill and dray.....	1694	1 30
	M. C. Hunter.....	Work	1695	28 55
	Harry Kinnear	Wiring	1696	26 55
	Mason Snow	Student labor	1697	9 60
	R. D. DeWolf.....	" "	1698	10 54
	Andrew Spittal	Labor	1699	29 76
	F. E. Sanborn.....	Money advanced	1700	48 00
	F. C. Clark.....	Supplies	1701	4 75
	Taylor, Williams & Co.	Coal	1702	6 25
	Laura L. Hill.....	Clerical work	1703	12 50
	A. F. Wilcox.....	Labor	1704	17 30
	S. N. Young.....	"	1705	9 45
	J. H. Randall.....	"	1706	4 25
	J. W. Shaw.....	"	1707	7 95
	Grace Young	"	1708	3 35
	W. D. Gibbs, Mgr.....	500 copies book.....	1709	18 00
	Metta Seymour	Clerical services	1710	4 65
	S. C. Derby.....	Lantern slides	1711	9 35
	C. L. Sackett.....	Part pay. of contract...	1712	58 33
	James LeBay	Cleaning cistern	1713	3 00
	Gustav Bruder	Band instruction	1714	24 00
	F. C. McKinney.....	Student labor	1715	10 00
	C. E. Miller.....	Plan and blue prints....	1716	19 25
10	Philip Long	Buffet lunch and meals..	1717	148 20
	F. C. Long.....	Guide work	1718	2 88
	Roy Thompson	"	1719	3 88
	W. G. Wallace.....	"	1720	3 75
	Annis McLaughlin	Clerical work	1721	2 55
	Wm. T. Magruder.....	Money advanced	1722	3 50
	Earl Orndorff	Guide work	1723	5 25
	Helen Powell	Clerical work	1724	4 50
	F. J. Hale.....	Labor	1725	12 53
	Grace Eagleson	Clerical work	1726	2 55
	E. G. Bailey.....	Labor	1727	6 25
	C. P. Linhart.....	Supplies	1728	3 00
	O. I. Dick.....	Student labor	1729	4 93
	J. M. Barringer.....	"	1730	1 95
	J. C. Britton.....	"	1731	1 50
	Wm. R. Lazenby.....	Department supplies ...	1732	4 35
	S. A. Norton.....	Book	1733	2 90
	Olive Jones	Money advanced	1734	11 48
	American Book Co.....	Book	1735	40 00
	Hann & Adair.....	Printing questions	1736	2 75
	Edward Thompson & Co.	Am. Ency. Law.....	1737	6 00
	W. H. Anderson & Co..	Reports	1738	8 50
	Sunday Creek Coal Co..	Coal	1739	30 03
	James Seaman	Insect cases	1740	40 00
	George Wahr	Books	1741	7 50
	Samuel Henshaw.....	Subs. to Psyche.....	1742	5 00
	Library Bureau	Cabinets and cards.....	1743	32 50
	R. R. Bowker.....	2 copies state publicat'ns	1744	4 00
	The Boston Book Co...	Books	1745	1 60

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Jan. 10	G. E. Stechert	Books, etc	1746	$5 20
	W. H. Loudermilk & Co.	President's message	1747	4 56
	G. P. Humphreys	Colonial tracts	1748	5 50
	The Seraphim B. B. Co.	Binding	1749	36 45
	Louis Siebert	Knives and pincers	1750	1 35
	Burrows Bros. Co.	Books	1751	61 15
	Chicago Blue P. P. Co.	Blue print paper	1752	2 40
	Emil Greiner	Tubes, etc	1753	12 25
	Kauffman, Lattimer	Drugs and sundries	1754	170 54
	Eimer & Amend	Chemicals	1755	96 20
	Keyless Lock Co.	Locks and repairs	1756	3 75
	Domestic Laundry	Laundry work	1757	17 75
	The H. Cole Co.	Supplies	1758	26 49
	Bausch & Lomb Opt. Co.	No. 22 Coddington	1759	1 15
	G. W. Clarke & Co.	Stakes	1760	5 38
	L. P. Bailey	Advertisement	1761	12 00
	H. Goldsmith	Music and repairs	1762	5 95
	L. C. Maddox	Advertisement	1763	10 0.
	Nat. Stockman & Farm.	"	1764	78 25
	Perry Smythe	Framing picture	1765	5 10
	Akron China Co.	Bisque wall	1766	1 00
	Col. Sewer Pipe Co.	Pipes	1767	85
	J. & G. Butler	1 box soap	1768	7 50
	Schaffer & Budenberg	1 Tachometer and charts	1769	156 50
	Crosby S. G. & V. Co.	Repairing	1770	4 56
	Mrs. Weisner, Secy.	Adv. in Rep. W. C. T. U.	1771	15 00
	Adams & Bagnall Co.	Globes, etc	1772	3 66
	J. S. Bushnell	Paper and cord	1773	5 20
	W. H. Miller Co.	Supplies	1774	215 56
	Col. Machine Co.	Rubber	1775	2 00
	Crane & Co.	Valves	1776	9 18
	West. Union Tel. Co.	Telegrams	1777	1 54
	India Alk. Wks.	1 barrel savogran	1778	17 94
	The Lunkenheimer Co.	Valves, etc	1779	25 06
	B. F. Goodrich Co.	Mats, etc	1780	30 28
	Webb Sta. & Print. Co.	Office supplies	1781	18 15
	John Wanamaker	Books	1782	25 60
	Standard Oil Co.	Oil and gasoline	1783	13 64
	W. S. Orvis	Paper and ribbon	1784	3 90
	Cent. O. Paper Co.	Paper	1785	92 30
	Nonotuck Silk Co.	Silk cult. cabinet	1786	2 50
	Kemp & Burpee Mg. Co.	Manure spreader	1787	50 00
	J. H. & F. A. Heyl	Lumber	1788	16 55
	Creamery Pkg. Mfg. Co.	Caps and supplies	1789	23 05
	W. B. Smith & Son	Cow	1790	50 00
	Alpha Dairy Co.	Milk tickets	1791	2 00
	Lewis Fink	Decorating, etc	1792	41 85
	Col. Brass Co.	Closet and lid	1793	12 90
	C. L. Wottring	Manure	1794	5 00
	Haydenville M. & M. Co.	Fireclay	1795	2 50
	Franklin Toilet Co.	Towel service	1796	1 95
	J. Carbutt	Plates	1797	1 41
	J. T. Barlow	Freezing	1798	10 80
	Col. Gas Co.	Coke	1799	10 20
	Col. Wire & Iron Wks.	Matting and device	1800	5 88
	A. T. Thompson & Co.	Lamp and stand	1801	24 00
	E. G. Soltmann	Frames	1082	14 00
	McClelland & Co.	Book	1803	60
	Keuffel & Esser Co.	Engineering instruments	1804	48 00
	Westinghouse Co	Coils, etc	1805	44 00
	The Col. M. & M. S. Co.	Hose	1806	10 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Jan. 10	Arthur Geren	Supplies	1807	$5 53
	E. Doddington & Co.	Lumber	1808	23 97
	Fred Charles	Hauling	1809	5 36
	Blackwood, Green & Co.	Supplies	1810	23 37
	McMillan Co	Books	1811	8 06
	Champlin Printing Co.	Printing	1812	21 65
	Col. Supply Co.	Supplies	1813	6 87
	J. M. & W. Westwater.	Lts and sockets	1814	6 36
	Schoedinger, F'rn & Co.	Supplies	1815	3 60
	Chicago Lab. Sup. Co.	"	1816	54 20
	Nitschke Bros	Printing	1817	24 95
	Tallmadge Hdw. Co.	Supplies	1818	7 78
	Elec. Appliance Co.	Wire and switches	1819	24 81
	Erner & Hopkins.	Supplies	1820	26 24
	Spahr & Glenn	Printing	1821	15 00
	Westinghouse Co	Transformer	1822	111 30
	Franklin Toilet Co.	Towel service	1823	2 25
15	Lily Weeks	Gym. services	1824	5 00
20	Michigan Brush Co.	Brushes	1825	22 05
22	W. O. Thompson	Salary Jan. 1900	1826	416 67
	Carl E. Steeb	" "	1827	60 00
25	Alexis Cope	" "	1828	187 50
27	Katherine Duncan	" "	1829	54 17
	T. F. Hunt	" "	1830	250 00
	G. W. Knight	" "	1831	250 00
	W. F. Hunter	" "	1832	250 00
	A. M. Bleile	" "	1833	225 00
	C. N. Brown	" "	1834	225 00
	A. C. Barrows	" "	1835	225 00
	R. D. Bohannon	" "	1836	225 00
	B. L. Bowen	" "	1837	225 00
	S. C. Derby	" "	1838	225 00
	J. V. Denney	" "	1839	225 00
	E. A. Eggers	" "	1840	225 00
	J. P. Gordy	" "	1841	225 00
	W. A. Kellerman	" "	1842	225 00
	W. R. Lazenby	" "	1843	225 00
	Wm. McPherson	" "	1844	225 00
	W. T. Magruder	" "	1845	225 00
	H. Osborn	" "	1846	225 00
	J. R. Smith	" "	1847	225 00
	W. H. Scott	" "	1848	225 00
	B. F. Thomas	" "	1849	225 00
	H. A. Weber	" "	1850	225 00
	N. W. Lord	" "	1851	200 00
	F. A. Ray	" "	1852	200 00
	G. B. Kauffman	" "	1853	200 00
	Edward Orton	" "	1854	180 00
	J. N. Bradford	" "	1855	180 00
	F. E. Sanborn	" "	1856	200 00
	H. C. Lord	" "	1857	160 00
	F. C. Clark	" "	1858	160 00
	G. W. McCoard	" "	1859	160 00
	C. P. Linhart	" "	1860	160 00
	D. S. White	" "	1861	160 00
	F. C. Caldwell	" "	1862	160 00
	E. A. Hitchcock	" "	1863	150 00
	C. S. Prosser	" "	1864	150 00
	W. D. Gibbs	" "	1865	160 00
	P. G. Bowman	" "	1866	140 00
	W. H. Page	" "	1867	140 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Jan. 27	W. H. Siebert	Salary Jan. 1900	1868	$135 00
	S. A. Norton	" "	1869	120 00
	E. B. Kinkead	" "	1870	120 00
	J. E. Boyd	" "	1871	120 00
	J. E. Allen	" "	1872	115 00
	C. E. Sherman	" "	1873	110 00
	T. E. French	" "	1874	110 00
	J. R. Taylor	" "	1875	110 00
	C. W. Mesloh	" "	1876	110 00
	A. W. Hodgman	" "	1877	110 00
	J. H. Schaffner	" "	1878	110 00
	W. E. Henderson	" "	1879	100 00
	J. A. Bownocker	" "	1880	100 00
	W. A. Knight	" "	1881	100 00
	C. L. Arnold	" "	1882	100 00
	K. D. Swartzel	" "	1883	100 00
	C. B. Morrey	" "	1884	100 00
	W. L. Graves	" "	1885	100 00
	C. A. Bruce	" "	1886	100 00
	F. M. Hamilton	" "	1887	80 00
	Geo. H. McKnight	" "	1888	90 00
	W. A. Landacre	" "	1889	70 00
	Wm. Renck	" "	1890	85 00
	J. S. Hine	" "	1891	85 00
	F. L. Landacre	" "	1892	85 00
	C. P. Crowe	" "	1893	80 00
	A. E. Vinson	" "	1894	80 00
	C. P. Souther	" "	1895	80 00
	F. E. Kester	" "	1896	80 00
	S. E. Canfield	" "	1897	75 00
	E. O. Randall	" "	1898	70 00
	D. F. Pugh	" "	1899	95 00
	W. F. Lavery	" "	1900	70 00
	C. B. Frederick	" "	1901	70 00
	J. B. Sanborn	" "	1902	70 00
	E. E. Somermeier	" "	1903	70 00
	T. K. Lewis	" "	1904	60 00
	F. A. Fish	" "	1905	60 00
	O. V. Brumley	" "	1906	50 00
	Silas Martin	" "	1907	50 00
	A. V. Bleininger	" "	1908	40 00
	J. B. Parker	" "	1909	30 00
	M. Dresbach	" "	1910	30 00
	D. A. Kohr	" "	1911	30 00
	H. C. Gore	" "	1912	30 00
	J. H. Vosskuehler	" "	1913	30 00
	A. H. McIntire	" "	1914	30 00
	E. L. Ball	" "	1915	30 00
	J. W. Young	" "	1916	30 00
	C. A. Grate	" "	1917	30 00
	F. J. Hale	" "	1918	30 00
	S. W. Collett	" "	1919	25 00
	H. W. Brown	" "	1920	25 00
	J. H. Collins	" "	1921	20 00
	J. A. Shauck	" "	1922	17 50
	E. G. Bailey	" "	1923	15 00
	R. E. McIntosh	" "	1924	12 50
	W. C. McCracken	" "	1925	150 00
	O. B. Jones	" "	1926	135 00
	E. E. Harrold	" "	1927	90 00
	J. P. Covan	" "	1928	70 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Jan. 27	G. A. Rose	Salary Jan. 1900	1929	$65 00
	F. Ruhlen	" "	1930	60 00
	A. F. Hall	" "	1931	60 00
	E. D. Cockins	" "	1932	58 33
	C. B. Guittard	" "	1933	55 00
	H. N. Townshend	" "	1934	55 00
	G. S. Kellicott	" "	1935	55 00
	Maude Jeffrey	" "	1936	55 00
	Lucy Allen	" "	1937	55 00
	C. M. Low	" "	1938	54 17
22	Lily Weeks	Gym. work	1939	5 00
27	F. K. Luke	Salary Jan. 1900	1940	50 00
	H. C. Price	" "	1941	60 00
	W. Standley	" "	1942	50 00
	B. LeBay	" "	1943	50 00
	D C. Huddleson	" "	1944	50 00
	T. Boude	" "	1945	45 00
	W. H. Case	" "	1946	45 00
	M. Peck	" "	1947	40 00
	A. Chantler	" "	1948	45 00
	G. A. Goodspeed	" "	1949	40 00
	J. H. Brown	" "	1950	40 00
	D. D. Geren	" "	1951	40 00
	W. Whitestine	" "	1952	40 00
	H. Chantler	" "	1953	40 00
	G. C. Denney	" "	1954	40 00
	M. N. Cook	" "	1955	40 00
	F. E. Osborn	" "	1956	40 00
	W. Townsel	" "	1957	25 00
	J. C. Perry	" "	1958	12 50
	J. Garrettson	" "	1959	37 39
	E. R. Hubler	" "	1960	33 33
	J. Kelly	" "	1961	25 00
	W. C. Weir	" "	1962	20 00
	A. G. McCall	" "	1963	20 00
	C. H. Woodruff	" "	1964	65 00
	E. Conway	" "	1965	20 00
	W. Conklin	" "	1966	40 00
	Benj. Irwin	" "	1967	45 00
	C. F. Dowd	" "	1968	20 00
	N. P. Oglesby	" "	1969	40 00
	J. W. Decker	" "	1970	140 00
	A. Dufour	" "	1971	25 00
	J. W. Groves	" "	1972	50 00
	W. Cannan	" "	1973	20 00
	W. E. Mann	" "	1974	25 00
	Grace Pitts	" "	1975	30 00
	Wm. C. Mills	" "	1976	35 00
	E. H. Moore	" "	1977	20 00
	C. L. E. Moore	" "	1978	10 00
	J. F. Jeffrey	" "	1979	10 00
	E. Smith	" "	1980	33 33
	D. A. Crowner	" "	1981	33 33
	C. S. Prosser	Office supplies	1982	1 45
	M. J. Kellenberger	Services	1983	21 43
	D. A. Kohr	Bal. of January salary	1894	30 00
Feb. 1	Lily Weeks	Janitress	1985	5 00
6	Lily Weeks	Gym. services	1986	5 00
7	Col. Gas Co.	Gas for January	1987	161 02
8	Nora Heath	Excess of fees, act 3, 14,' 89	1988	2 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Jan. 12	Lily Weeks	Salary	1989	$5 00
15	C. N. Mooney	Stamp and pad	1990	1 25
	Arthur Geren	Drawing utensils	1991	5 40
	W. L. Redrow	Lab. assistance	1992	17 75
	C. P. Linville	" "	1993	5 80
	F. C. Clark	Dept. supplies	1994	3 55
	James G. Sterling	Student labor	1995	6 88
	Frank W. Arnold	" "	1996	3 75
	Wm. Erdman	" "	1997	3 00
	M. C. Hunter	" "	1998	12 30
	O. I. Dick	" "	1999	9 23
	B. B. Wells	" "	2000	8 03
	B. F. Thomas	Dept. supplies	2001	5 61
	Andrew Spittal	Labor	2002	83 47
	M. C. Hunter	"	2003	2 48
	R. E. McIntosh	"	2004	10 88
	Ray McCallum	Adv. in student direc'y.	2005	5 00
	M. B. Lamb	Flooring stalls	2006	4 80
	H. J. Hammond	Hospital supplies	2007	3 60
	Fred Fleischer	Wheeling coal	2008	16 50
	Richard Spencer	" "	2009	24 75
	E. H. Barton	Carpentry	2010	55 00
	A. F. Wilcox	"	2011	11 80
	Wilbert Morlan	"	2012	15 50
	J. W. Cawthon	"	2013	1 50
	J. H. Randall	"	2014	3 25
	Stella E. Canfield	Dept. supplies	2015	1 75
	Helen Potts	Piano playing	2016	4 00
	S. T. Hallsman	Painting	2017	80
	J. V. Denney	Department supplies	2018	2 00
	S. T. Barrows	Lang's Homer	2019	98
	J. A. Beer	Laboratory assistance	2020	3 60
	M. Dresbach	Department supplies	2021	7 62
	Metta Seymour	Clerical work	2022	4 75
	E. G. Bailey	Labor	2023	7 20
	R. R. Harkins	Drafting engine	2024	3 75
	F. J. Hale	Drafting	2025	2 50
	Arthur Geren	Supplies	2026	1 80
	Charles R. Hall	Package	2027	50
	William Garret	Steam fitting	2028	1 50
	Roger DeWolf	Wiring	2029	3 15
	Harry Kinnear	"	2030	13 05
	Edw. Orton	Drafting	2031	12 00
	Wm. McPherson	Supplies	2032	3 15
	W. O. Thompson	Maps	2033	2 40
	F. C. McKinney	Guide	2034	4 50
	Roy Thompson	"	2035	4 13
	Frank C. Long	"	2036	3 88
	W. G. Wallace	"	2037	9 13
	E. L. Orndorff	"	2038	4 00
	H. C. Herrick	"	2039	90
	Edith Seymour	Piano playing	2040	2 50
	R. W. Funk	Work in store room	2041	25 00
	J. W. Shaw	Assistance law library	2042	9 45
	S. N. Young	Library work	2043	10 90
	Mabel Huddleson	Library work	2044	10 50
	Mason Snow	Work in law library	2045	11 50
	J. M. & W. Westwater	Supplies	2046	10 00
	Cap. City Mchn. Wks.	"	2047	26 62
	Cherington P. & E. Co.	Stamp and pad	2048	1 10
	Nitschke Bros	Printing	2049	3 40

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Feb. 15	The McMillan Co.	Books	2050	$8 01
	Franklin Toilet Sup. Co.	Towel service	2051	6 75
	Palmer & Beck	Supplies	2052	39 61
	The Tallmadge Hd. Co.	Hardware	2053	21 14
	Spahr & Glenn	Printing	2054	12 75
	Schoedinger, F'rn & Co.	Hardware	2055	29 58
	James Penn	Freight and drayage	2056	3 04
	Blackwood, Green & Co.	Hardware	2057	44 26
	E. Doddington & Co.	Lumber	2058	23 74
	Bausch & Lomb Opt. Co.	Supplies	2059	5 20
	Columbus Supply Co.	Department supplies	2060	49 16
	G. E. Stechert	Books	2061	76 37
	Cent. O. Paper Co.	Paper	2062	10 16
	H. Braun Sons & Co.	Instruments	2063	14 96
	Champlin Printing Co.	Printing	2064	17 50
	Hann & Adair	"	2065	2 85
	Miller Furniture Co.	Furniture	2066	47 90
	Murray City Coal Co.	Coal	2067	1,247 46
	Pharm. Rev. Pub. Co.	1 copy review for 1 year	2068	2 50
	Helman-Taylor Co	Index	2069	10 00
	Library Bureau	Cabinets and subscrip.	2070	33 00
	Engelke & Bigelow	Freight and drayage	2071	61 89
	Nat. Educational Assn.	Volume proceedings	2072	2 00
	C. A. Waldo	Proocedings, Vol VII	2073	2 00
	H. L. Fairchild	Geol. Soc. of Am. Vol X	2074	5 00
	R. R. Bowker	Society publications	2075	2 50
	Am. S. of Mech. Eng.	Copy proceedings	2076	1 25
	Seraphim B. B. Co.	Binding	2077	29 90
	Burrows Bros. & Co.	Books	2078	99 03
	Ohio Furn. Co.	Case and book case	2079	31 00
	West. Elec. Inst. Co.	Supplies	2080	21 18
	Hann & Adair	Printing	2081	20 16
	Domestic Laundry	Towel washing	2082	22 32
	Funk & Wagnalls	Cyclopedia	2083	6 00
	Houghton-Mifflin Co.	Books	2084	2 76
	T. Y. Crowell & Co.	Book	2085	1 14
	John H. Grove	Insurance premium	2086	12 35
	Samuel Smith	Brush and blacking	2087	4 40
	Kelton & Converse	Lumber	2088	1 07
	E. A. Kinsey Co.	Steel	2089	5 36
	Nicholson File Co.	Files	2090	12 26
	G. B. Schulte Sons Co.	Steel	2091	10 60
	Spg. Mchn. & Tool Co.	Lathe	2092	570 00
	H. Kohlbusch	Weights	2093	6 04
	E. G. Smith	Calipers	2094	22 50
	Hyatt R. B. Co.	Instrument	2095	7 59
	Hanna Paint Mfg. Co.	Paint and surfacer	2096	2 35
	Elec. Sup. & Const. Co.	Supplies	2097	33
	H. Cole Co.	Telescope	2098	3 00
	W. I. Carruthers	Material and labor	2099	78 81
	Col. Gas Co.	Coke	2100	8 16
	A. H. Cross, Mgr.	Advertisement	2101	12 00
	Nat. Stockman & Farm.	Advertising	2102	63 00
	R. M. Donaldson	"	2103	5 00
	L. S. Wells	Books	2104	7 20
	Buntin Bros	Material for bandages	2105	4 80
	L. P. Bailey	Advertisement	2106	4 00
	Reynolds Bros	Instruments	2107	6 60
	Sunday Creek Coal Co.	Coal	2108	49 88
	DeLaval Sep. Co.	Rope belts	2109	1 75
	Watertown Ther. Co.	Thermometers	2110	9 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Feb. 15	C. L. Kiewert	Brushes	2111	$7 50
	Howe Scale Co	Supplies	2112	8 00
	Creamery Package Co.	Supplies	2113	58 77
	D. H. Burrell & Co	Apparatus	2114	64 14
	Osborn, Will's. & Horn	Coal	2115	34 22
	M. Armbruster & Sons.	Scenery repairing	2116	2 00
	Ed. P. Budge	Engrav. of Dr. Orton	2117	55 00
	Amer. Grange Bulletin.	Advertising	2118	18 90
	Webb Sta. & Ptg. Co.	Pad and ink	2119	75
	Globe Wernecke Co.	Cabinet	2120	136 00
	W. S. Orvis	Ribbon	2121	1 00
	O. S. Lear	Type writer repairs	2122	4 00
	L. A. Harsh & Co	Mop pails	2123	3 00
	Standard Oil Co	Oil	2124	8 73
	J. M. Kerr	Window rubbers	2125	2 50
	McClelland & Co	Calendar pads	2126	55
	Leader Printing Co.	Advertising	2127	12 50
	Central Union Tel. Co.	Telephone service	2128	86 03
	E. B. Vorhees, Secy.	Mbrsp. ass. agr. colleges	2129	10 00
	Amer. Dist. Tel. Co.	Rent of boxes	2130	27 00
	Logan McCormick	Picture frame	2131	2 95
	T. J. Dundon & Co	Sawdust	2132	3 00
	Standard Oil Co	Oil	2133	88
	Westingh'se E. Mfg. Co.	Coils	2134	3 00
	Penna. Fuel Co	Lump coal	2135	2 75
	Col. Bolt Works	Bolts	2136	3 20
	Stand. Thermometer Co.	Globes	2137	40
	Sterling Arc Lamp Co.	"	2138	1 00
	Col. M. & Mine Sup. Co.	Supplies	2139	19 14
	The Elec. S. & C. Co.	"	2140	4 50
	Erner & Hopkins Co.	"	2141	22 63
	Kauffman, Lattimer Co.	Drugs and sundries	2142	192 74
	Stillwell-Bierce-Smith-Vaile Co., The	Pumps, etc	2143	1 00
	Sherwood Mfg. Co.	Awning	2144	72
	Schaffer & Budenburg.	Thermometers	2145	18 00
	American Meter Co.	Gauge meters	2146	7 90
	Deane Steam Pump Co.	Pumps	2147	202 35
	Andrew Kaiser	Sterilizers	2148	7 75
	Toledo Blade Co	Advertisement	2149	6 75
	Commercial Tribune Co.	"	2150	9 40
	Plain Dealer Pub Co.	"	2151	7 90
	O. S. Journal Pub. Co.	"	2152	7 50
	Carl Braun	Pressed cork	2153	5 00
	Philip Neel	Printing labels	2154	2 53
	J. S. Abbott & Co	Hardware	2155	16 75
	Longmans, Green & Co.	Books	2156	1 79
	L. Gasteloecchi & Co.	Carts	2157	14 03
	Dunn, Taft & Co	Dry goods	2158	4 65
	Crystal Ice Mfg. Co.	Ice coupon book	2159	2 00
	Hager & Graves	Groceries	2160	47 50
	Alpha Dairy Co	Milk tickets	2161	3 00
	M. V. Mitchell & Son.	Labor	2162	3 20
	Capital City Mach. Wks.	Iron grate	2163	6 30
	Flint & Walling Mfg. Co.	Figure 434A	2164	4 25
	The A. H. Andrews Co.	Hyloplate	2165	21 13
	Vogelgesang Fur. Co.	Furnace repairs	2166	3 50
	The W. M. Taylor M. & Grate Co	Mantel and trim	2167	17 50
	The B. F. Goodrich Co.	Rubber mat.	2168	5 05
	Wm. Bebb	Painting	2169	5 95

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Feb. 15	W. F. Worcester	Stove grates	2170	$1 20
	Jacob Good	Carpentry	2171	69 35
	Einer & Amend	Chemicals	2172	10 05
	Emil Greiner	Supplies	2173	24 09
	Kimball & Matthews	"	2174	1 60
	Quaker City Rubber Co.	Tubing	2175	21 60
	Merck & Co	Celloidin	2176	2 04
	H. Troemner	Weights, etc	2177	12 26
	Denver Fire Clay Co	Supplies	2178	228 85
	Kauffman-Lattimer Co.	Drugs and sundries	2179	43 72
	C. L. Vogel	Labor and material	2180	15 00
	A. G. Spaulding & Bro.	Lockers	2181	375 00
	Wm. Burdell, Jr	Repairs	2182	3 25
	E. G. Saltmann	Blue print frames	2183	7 00
	Gustav Bruder	Band instruction	2184	42 00
24	Thomas F. Hunt	Salary Feb. 1900	2185	250 00
	Wm. D. Gibbs	" "	2186	160 00
	John W. Decker	" "	2187	140 00
	Frank Ruhlen	" "	2188	60 00
	H. A. Weber	" "	2189	225 00
	A. E. Vinson	" "	2190	80 00
	Geo. W. Knight	" "	2191	250 00
	John B. Sanborn	" "	2192	70 00
	A. M. Bleile	" "	2193	225 00
	C. B. Morrey	" "	2194	100 00
	M. Dresbach	" "	2195	30 00
	H. C. Lord	" "	2196	160 00
	W. A. Kellerman	" "	2197	225 00
	J. H. Schaffner	" "	2198	90 00
	C. W. Collett	" "	2199	25 00
	Alice Dufour	" "	2200	25 00
	Fred Luke	" "	2201	50 00
	Wm. McPherson	" "	2202	225 00
	S. A. Norton	" "	2203	120 00
	W. E. Henderson	" "	2204	100 00
	D. A. Kohr	" "	2205	60 00
	H. C. Gore	" "	2206	30 00
	J. F. Jeffrey	" "	2207	10 00
	C. N. Brown	" "	2208	225 00
	C. E. Sherman	" "	2209	110 00
	J. W. Groves	" "	2210	50 00
	Edward Orton, Jr	" "	2211	180 00
	A. V. Bleininger	" "	2212	40 00
	P. G. Bowman	" "	2213	140 00
	C. P. Souther	" "	2214	80 00
	J. N. Bradford	" "	2215	180 00
	T. E. French	" "	2216	110 00
	T. K. Lewis	" "	2217	60 00
	J. H. Vosskuehler	" "	2218	30 00
	Silas Martin	" "	2219	50 00
	F. C. Clark	" "	2220	160 00
	J. P. Gordy	" "	2221	225 00
	Grace Pitts	" "	2222	30 00
	F. C. Caldwell	" "	2223	160 00
	F. A. Fish	" "	2224	60 00
	J. P. Covan	" "	2225	70 00
	A. C. Barrows	" "	2226	225 00
	J. R. Taylor	" "	2227	110 00
	W. H. Siebert	" "	2228	135 00
	J. A. Bownocker	" "	2229	100 00
	Charles Prosser	" "	2230	150 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Feb. 24	W. C. Mills	Salary Feb. 1900	2231	$35 00
	E. A. Eggers	" "	2232	225 00
	C. W. Mesloh	" "	2233	110 00
	E. H. Moore	" "	2234	20 00
	J. R. Smith	" "	2235	225 00
	A. W. Hodgman	" "	2236	110 00
	W. R. Lazenby	" "	2237	225 00
	H. C. Price	" "	2238	40 00
	F. E. Sanborn	" "	2239	200 00
	W. A. Knight	" "	2240	100 00
	C. P. Crowe	" "	2241	80 00
	W. H. Renck	" "	2242	85 00
	A. H. McIntyre	" "	2243	30 00
	S. C. Derby	" "	2244	225 00
	W. F. Hunter	" "	2245	250 00
	J. H. Collins	" "	2246	20 00
	J. A. Shauck	" "	2247	17 50
	E. B. Kinkead	" "	2248	120 00
	W. H. Page	" "	2249	140 00
	E. O. Randall	" "	2250	70 00
	D. F. Pugh	" "	2251	95 00
	O. B. Jones	" "	2252	135 00
	H. N. Townshend	" "	2253	55 00
	Gertrude Kellicott	" "	2254	55 00
	Maude Jeffrey	" "	2255	55 00
	Lucy Allen	" "	2256	55 00
	C. B. Guittard	" "	2257	55 00
	R. D. Bohannon	" "	2258	225 00
	G. W. McCoard	" "	2259	160 00
	C. L. Arnold	" "	2260	100 00
	K. D. Swartzel	" "	2261	100 00
	Emma L. Ball	" "	2262	30 00
	J. W. Young	" "	2263	30 00
	C. L. E. Moore	" "	2264	10 00
	W. T. Magruder	" "	2265	225 00
	E. A. Hitchcock	" "	2266	150 00
	F. J. Hale	" "	2267	30 00
	C. A. Grate	" "	2268	30 00
	A. F. Hall	" "	2269	60 00
	F. A. Ray	" "	2270	200 00
	N. W. Lord	" "	2271	200 00
	E. E. Somermeier	" "	2272	70 00
	G. B. Kauffman	" "	2273	200 00
	W. A. Landacre	" "	2274	70 00
	E. E. Harrold	" "	2275	90 00
	N. P. Oglesby	" "	2276	40 00
	W. H. Scott	" "	2277	225 00
	F. M. Hamilton	" "	2278	80 00
	C. P. Linhart	" "	2279	160 00
	S. E. Canfield	" "	2280	75 00
	D. C. Huddleson	" "	2281	50 00
	B. F. Thomas	" "	2282	225 00
	J. E. Boyd	" "	2283	120 00
	F. E. Kester	" "	2284	80 00
	H. W. Brown	" "	2285	25 00
	J. V. Denney	" "	2286	225 00
	W. L. Graves	" "	2287	100 00
	G. H. McKnight	" "	2288	90 00
	H. C. Allen	" "	2289	115 00
	J. B. Parker	" "	2290	30 00
	B. L. Bowen	" "	2291	225 00

STATEMENT II—Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Feb. 24	C. A. Bruce	Salary Feb. 1900	2292	$100 00
	C. F. Dowd	" "	2293	20 00
	D. S. White	" "	2294	160 00
	W. F. Lavery	" "	2295	70 00
	C. B. Frederick	" "	2296	70 00
	O. V. Brumley	" "	2297	50 00
	H. M. Osborn	" "	2298	225 00
	Jas. S. Hine	" "	2299	85 00
	F. L. Landacre	" "	2300	85 00
	W. O. Thompson	" "	2301	416 67
	Alexis Cope	" "	2302	187 50
	Carl E. Steeb	" "	2303	60 00
	E. D. Cockins	" "	2304	58 33
	K. D. Duncan	" "	2305	54 17
	E. R. Hubler	" "	2306	33 33
	W. C. McCracken	" "	2307	150 00
	C. M. Low	" "	2308	54 17
	Wm. Standley	" "	2309	50 00
	Benj. LeBay	" "	2310	50 00
	Thos. Boude	" "	2311	45 00
	Wm. H. Case	" "	2312	45 00
	Marion Peck	" "	2313	40 00
	Geo. R. Rose	" "	2314	65 00
	Jos. Garrettson	" "	2315	37 39
	Benj. Irwin	" "	2316	45 00
	J. C. Perry	" "	2317	12 50
	G. A. Goodspeed	" "	2318	40 00
	R. E. McIntosh	" "	2319	12 50
	D. D. Geren	" "	2320	40 00
	T. E. Osborn	" "	2321	40 00
	J. H. Brown	" "	2322	40 00
	Wm. Whitestine	" "	2323	40 00
	G. C. Denny	" "	2324	40 00
	E. G. Bailey	" "	2325	15 00
	M. N. Cook	" "	2326	40 00
	W. Conklin	" "	2327	40 00
	H. Chantler	" "	2328	40 00
	A. Chantler	" "	2329	45 00
	Earl Conway	" "	2330	20 00
	James Kelly	" "	2331	25 00
	W. C. Weir	" "	2332	20 00
	Elisha Smith	" "	2333	33 33
	D. A. Crowner	" "	2334	33 33
	C. H. Woodruff	" "	2335	65 00
	W. Townsel	" "	2336	25 00
	Wm. Cannan	" "	2337	20 00
	W. E. Mann	" "	2338	25 00
	A. G. McCall	" "	2339	27 00
19	Ohio National Bank	Foreign money order	2340	3 40
	Ohio National Bank	" "	2341	106 55
20	Lily Weeks	Services	2342	5 00
21	Ohio National Bank	Foreign money order	2343	7 25
	A. McLaughlin	Clerical work	2344	2 55
26	M. J. Kellenberger	Services	2345	25 00
	Lily Weeks	Janitress	2346	4 00
March 1	A. J. Loyne	Return of fees	2347	30 00
5	Lily Weeks	Janitress	2348	5 00
7	Murray City Coal Co	Coal	2349	932 79
6	Thos. J. Godfrey	Trustee expenses	2350	10 25
7	Engelke & Bigelow	Freight and drayage	2351	22 99
	Tracy-Wells Co	Supplies	2352	13 77

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Mar. 7	Kauffman–Lattimer Co.	Drugs and sundries	2353	$125 10
	Schoedinger, F'rn & Co.	Shears and nails	2354	2 75
	Payne McD. Hdw. Co.	Hardware	2355	9 95
	Erner & Hopkins	"	2356	25 40
	Cent. O. Paper Co.	Paper	2357	22 41
	James P. Carlisle	Sand, cement, etc.	2358	8 90
	Tallmadge Hdw. Co.	Hardware	2359	23 04
	Columbus Supply Co.	Supplies	2360	15 90
	Blackwood, Green & Co.	Metal and labor	2361	11 72
	Robert A. McClure	Table frames, etc.	2362	206 02
	Amer. Dist. Tel. Co.	Messenger, etc.	2363	1 25
	W. S. Orvis	Paper and ink	2364	1 40
	H. Braun Sons & Co.	Instruments	2365	7 75
	Columbus Bolt Works.	Bolts	2366	80
	J. S. Abbott & Co.	Hardware	2367	4 15
	Hall–Collins Hdw. Co.	Files and sandpaper	2368	6 63
	Elec. Sup. & Const. Co.	Electrical supplies	2369	13 28
	Miller Fur. Co.	Special box	2370	15 00
	Champlin Printing Co.	Printing	2371	35 50
	Spahr & Glenn	"	2372	7 25
	Standard Oil Co.	Oil	2373	34 73
	Col. M. & M. Sup. Co.	Supplies	2374	41 40
	Domestic Laundry	Laundry work	2375	21 83
	Capital City Mach. Co.	Iron and castings	2376	27 78
	J. S. Maclean	Rifle molds	2377	93 75
	E. C. Karshner	Postal guide	2378	2 50
	Hann & Adair	P. O. cards	2379	2 75
	Western Union Tel. Co.	Telegrams	2380	4 89
	Nitschke Bros	Printing	2381	9 40
	Col. Transfer Co.	Carriage service	2382	5 00
	J. F. Ridenour	Half dozen files	2383	1 25
	Eaton Mach. Works.	Lock and hasps	2384	15 18
	Central Union Tel. Co.	Rent and tolls	2385	12 96
	Wm. Taylor M. & G. Co.	Mantel cabinets	2386	75 00
	Batterson Dec. House.	Papering	2387	8 20
	McAllister, Moh. & Co.	Desk	2388	18 00
	Fish Press Brick Co.	Brick	2389	13 00
	New Col. Bridge Co.	Plate and drayage	2390	3 06
	Cherington P. & E. Co.	Stamps	2391	1 55
	P. C. Cull	Mason work	2392	6 75
	Kimball & Matthews.	One dozen plates	2393	56
	Hart & Crouse	Shaker bar and labor	2394	2 06
	J. & G. Butler	Soap and candles	2395	24 82
	L. A. Harsh & Co.	Springs and wringer	2396	1 50
	Wassall F. C. Co.	Cement	2397	5 70
	Ruggles–Gale Co	Record	2398	1 25
	J. J. Smith & Co.	Stamp and pad	2399	1 35
	Col. Pharmacal Co.	Rubber tubing	2400	15
	Jeffrey Mfg. Co.	Chain	2401	8 00
	J. M. & W. Westwater.	Wire shades, etc.	2402	3 40
	Lewis Fink	Picture rail	2403	2 60
	Lawrence Press Co.	Labels	2404	3 00
	Seraphim Blank B. Co.	Binding	2405	145 15
	Col. Gas Co.	February gas	2406	161 75
	J. A. Beer	Laboratory work	2407	2 10
	W. H. Waters	Labor	2408	42 00
	Forest Spencer	Wheeling coal	2409	9 00
	F. W. Arnold	Student assistance	2410	4 94
	O. I. Dick	Labor	2411	8 50
	M. C. Hunter	"	2412	9 00
	J. G. Sterling	"	2413	4 25

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Mar. 7	B. B. Wells	Labor	2414	$8 88
	Melvin Dresbach	Dept. supplies	2415	5 75
	Spahr & Glenn	Envelopes	2416	2 25
	J. W. Shaw	Work in library	2417	8 95
	Mabel Huddleson	Labor	2418	10 00
	S. N. Young	Work	2419	9 10
	Mason Snow	Labor in library	2420	8 95
	Roy Thompson	Guide	2421	5 00
	F. C. McKinney	"	2422	3 63
	F. C. Long	"	2423	6 25
	Helen Powell	Clerical services	2424	3 15
	K. H. Duncan	Street car tickets	2425	5 00
	Grace Eagleson	Clerical services	2426	4 47
	E. L. Orndorf	Guide	2427	5 38
	Andrew Spittal	Labor	2428	21 21
	W. L. Redrow	"	2429	17 70
	R. W. Funk	Work in store room	2430	16 42
	Phil. Long	Luncheon	2431	7 50
	E. G. Bailey	Labor	2432	6 10
	T. A. Panter	Masonry	2433	2 10
	Metta Seymour	Clerical work	2434	6 00
	Edith Seymour	Piano playing	2435	3 00
	Helen Potts	"	2436	6 25
	H. C. Price	Photographs	2437	2 75
	Richard Spencer	Wheeling coal	2438	42 00
	C. L. Sackett	Lantern, extra copies	2439	8 00
	H. J. Hammond	Hospital supplies	2440	3 00
	J. Stainbrook	Work in boiler house	2441	9 00
	Wilbert Morelan	Carpentry	2442	14 25
	J. H. Randall	"	2443	34 50
	E. J. Barton	"	2444	13 75
	A. F. Wilcox	"	2445	16 38
	H. O. Carrington	Lantern	2446	26 67
	A. H. Barber Mfg. Co.	Castings	2447	9 00
	Chic. Blue Pr. Paper Co.	Blueprint paper	2448	4 80
	Baker & Adamson C. Co.	Chemicals, etc	2449	36 65
	Eimer & Amend	"	2450	13 40
	Emil Greiner	Apparatus	2451	29 53
	Chic. Laboratory S. Co.	Supplies	2452	14 18
	Akron Chemical Co.	Bisque ware	2453	2 00
	Amer. Aristotype Co.	Paper	2454	9 75
	Bausch & Lomb Opt. Co.	Apparatus	2455	7 35
	Open Court Pub. Co.	Portraits	2456	12 00
	Elec. Appliance Co.	Conduit and clips	2457	6 08
	Babcock & Wilcox Co.	Worm and wheel	2458	18 65
	M. P. Streett	Masonry and material	2459	22 00
	M. R. Shellenberger	Advertisement	2460	1 50
	Jas. McCrea & Co.	Steam clamp	2461	9 75
	Fairbanks, Morse & Co.	Standard sand	2462	10 50
	Riehle Bros. & Co.	Molds and sieve	2463	47 50
	W. H. Anderson & Co.	Reports	2464	15 00
	C. Scribner's Sons	Commercial Cuba	2465	3 27
	R. B. Hough	Specimen pages	2466	9 76
	H. O. Carrington	Normal lantern	2467	26 67
	D'Este & Seely Co.	Trap	2468	4 00
	M. P. Streett	Material and labor	2469	4 00
	Henry Barnard	Journal of Education	2470	120 00
	Burrows Bros. & Co.	Books	2471	94 26
	Boston Test. Lab.	Subscription	2472	3 00
	Am. Inst. Elec. Engrs.	Reports	2473	6 00
	Boston Book Co.	Books	2474	83 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Mar. 7	Robt. I. Fulton	Desks	2475	$10 00
	G. E. Stechert	Books	2476	944 07
	Ohio Nat. Bank	Foreign money order	2477	11 95
	R. M. Rownd, P. M.	Dep. for 2nd class mat.	2478	10 00
	J. N. Bradford	Lettering commissions	2479	14 25
	Webb Sta. & Ptg. Co.	Office supplies	2480	11 00
	Chic. Lab. Sup. & S. Co.	Supplies	2481	5 75
	Osborne, Will's. & Horn	Coal	2482	59 16
	J. T. Godfrey	Trustee expense	2483	20 11
	John W. Beech	Salary	2484	60 00
	Lily Weeks	Janitress	2485	5 00
	Postal Tel. Cable Co.	Telegrams	2486	66
	D. A. Crowner	Salary March, 1900	2487	33 34
	Elisha Smith	" "	2488	33 34
	Lily Weeks	Services, March, 1900	2489	5 00
	T. F. Hunt	Salary March, 1900	2490	250 00
	Wm. D. Gibbs	" "	2491	160 00
	J. W. Decker	" "	2492	140 00
	Frank Ruhlen	" "	2493	60 00
	H. A. Weber	" "	2494	225 00
	A. E. Vinson	" "	2495	80 00
	G. W. Knight	" "	2496	250 00
	John B. Sanborn	" "	2497	70 00
	A. M. Bleile	" "	2498	225 00
	C. B. Morrey	" "	2499	100 00
	M. Dresbach	" "	2500	30 00
	H. C. Lord	" "	2501	160 00
	W. A. Kellerman	" "	2502	225 00
	J. H. Schaffner	" "	2503	100 00
	S. W. Collett	" "	2504	25 00
	Alice Dufour	" "	2505	25 00
	F. K. Luke	" "	2506	50 00
31	Wm. McPherson	" "	2507	225 00
	S. A. Norton	" "	2508	120 00
	W. E. Henderson	" "	2509	100 00
	D. A. Kohr	" "	2510	60 00
	H. C. Gore	" "	2511	30 00
	J. F. Jeffrey	" "	2512	10 00
	C. N. Brown	" "	2513	225 00
	C. E. Sherman	" "	2514	110 00
	J. W. Groves	" "	2515	50 00
	Ed. Orton	" "	2516	180 00
	A. V. Bleininger	" "	2517	40 00
	Wm. Cannan	" "	2518	20 00
	P. G. Bowman	" "	2519	140 00
	C. P. Souther	" "	2520	80 00
	J. N. Bradford	" "	2521	180 00
	T. E. French	" "	2522	110 00
	T. K. Lewis	" "	2523	60 00
	J. H. Vosskuehler	" "	2524	30 00
	Silas Martin	" "	2525	50 00
	F. C. Clark	" "	2526	160 00
	W. E. Mann	" "	2527	25 00
	Grace Pitts	" "	2528	30 00
	J. P. Gordy	" "	2529	225 00
	F. C. Caldwell	" "	2530	160 00
	F. A. Fish	" "	2531	60 00
	J. P. Covan	" "	2532	70 00
	A. C. Barrows	" "	2533	225 00
	J. R. Taylor	" "	2534	110 00
	W. H. Siebert	" "	2535	135 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Mar. 31	J. A. Bownocker	Salary March, 1900	2536	$100 00
	C. S. Prosser	" "	2537	150 00
	W. C. Mills	" "	2538	35 00
	E. A. Eggers	" "	2539	225 00
	C. W. Mesloh	" "	2540	110 00
	E. H. Moore	" "	2541	20 00
	J. R. Smith	" "	2542	225 00
	A. W. Hodgman	" "	2543	110 00
	W. R. Lazenby	" "	2544	225 00
	H. C. Price	" "	2545	50 00
	F. E. Sanborn	" "	2546	200 00
	W. A. Knight	" "	2547	100 00
	C. W. Crowe	" "	2548	80 00
	W. H. Renck	" "	2549	85 00
	A. H. McIntire	" "	2550	30 00
	S. C. Derby	" "	2551	225 00
	W. F. Hunter	" "	2552	250 00
	J. H. Collins	" "	2553	20 00
	J. A. Shauck	" "	2554	17 50
	E. B. Kinkead	" "	2555	120 00
	W. H. Page	" "	2556	140 00
	E. O. Randall	" "	2557	70 00
	D. F. Pugh	" "	2558	95 00
	O. B. Jones	" "	2559	135 00
	H. N. Townshend	" "	2560	55 00
	Gertrude Kellicott	" "	2561	55 00
	Maude D. Jeffrey	" "	2562	55 00
	Lucy Allen	" "	2563	55 00
	C. B. Guittard	" "	2564	55 00
	R. D. Bohannon	" "	2565	225 00
	G. W. McCoard	" "	2566	160 00
	C. L. Arnold	" "	2567	100 00
	K. D. Swartzel	" "	2568	100 00
	E. L. Ball	" "	2569	30 00
	J. W. Young	" "	2570	30 00
	C. L. E. Moore	" "	2571	10 00
	W. T. Magruder	" "	2572	225 00
	E. A. Hitchcock	" "	2573	150 00
	F. J. Hale	" "	2574	30 00
	C. A. Grate	" "	2575	30 00
	A. F. Hall	" "	2576	60 00
	F. A. Ray	" "	2577	200 00
	N. W. Lord	" "	2578	200 00
	E. E. Somermeier	" "	2579	70 00
	G. B. Kauffman	" "	2580	200 00
	W. A. Landacre	" "	2581	70 00
	E. E. Harrold	" "	2582	90 00
	N. P. Oglesby	" "	2583	40 00
	W. H. Scott	" "	2584	225 00
	F. M. Hamilton	" "	2585	80 00
	C. P. Linhart	" "	2586	160 00
	S. E. Canfield	" "	2587	75 00
	D. C. Huddleson	" "	2588	50 00
	B. F. Thomas	" "	2589	225 00
	J. E. Boyd	" "	2590	120 00
	F. E. Kester	" "	2591	80 00
	H. W. Brown	" "	2592	25 00
	J. V. Denney	" "	2593	225 00
	W. L. Graves	" "	2594	100 00
	Geo. H. McKnight	" "	2595	90 00
	H. C. Allen	" "	2596	115 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
Mar. 31	J. B. Parker	Salary March, 1900	2597	$30 00
	B. L. Bowen	" "	2598	225 00
	C. A. Bruce	" "	2599	100 00
	C. F. Dowd	" "	2600	20 00
	D. S. White	" "	2601	160 00
	W. F. Lavery	" "	2602	70 00
	C. B. Frederick	" "	2603	70 00
	O. V. Brumley	" "	2604	50 00
	H. M. Osborn	" "	2605	225 00
	J. S. Hine	" "	2606	85 00
	F. L. Landacre	" "	2607	85 00
	W. O. Thompson	" "	2608	416 67
	Alexis Cope	" "	2609	187 50
	Carl E. Steeb	" "	2610	60 00
	E. D. Cockins	" "	2611	58 33
	E. R. Hubler	" "	2612	33 33
	K. H. Duncan	" "	2613	54 17
	W. C. McCracken	" "	2614	150 00
	C. M. Low	" "	2615	54 17
	W. A. Standley	" "	2616	50 00
	Benj. LeBay	" "	2617	50 00
	T. A. Boude	" "	2618	45 00
	W. H. Case	" "	2619	45 00
	Marion Peck	" "	2620	40 00
	Geo. R. Rose	" "	2621	65 00
	J. Garrettson	" "	2622	37 39
	Benj. Irwin	" "	2623	45 00
	J. C. Perry	" "	2624	12 50
	G. A. Goodspeed	" "	2625	40 00
	R. E. McIntosh	" "	2626	12 50
	D. D. Geren	" "	2627	40 00
	T. E. Osborn	" "	2628	40 00
	J. H. Brown	" "	2629	40 00
	Wm. Whitestine	" "	2630	40 00
	G. C. Denny	" "	2631	40 00
	E. G. Bailey	" "	2632	15 00
	A. G. McCall	" "	2633	27 00
	M. N. Cook	" "	2634	40 00
	W. Conklin	" "	2635	40 00
	H. Chantler	" "	2636	40 00
	Arthur Chantler	" "	2637	45 00
	Earl Conway	" "	2638	20 00
	James Kelly	" "	2639	25 00
	W. C. Weir	" "	2640	20 00
	W. Townsel	" "	2641	25 00
	C. H. Woodruff	" "	2642	65 00
23	R. M. Cooper	Return fees	2643	10 00
27	Lily Weeks	Salary one week	2644	5 00
30	M. J. Kellenberger	Services	2645	20 00
April 4	O. I. Dick	Student labor	2646	7 03
	A. F. Wilcox	Carpenter work	2647	25 25
	F. C. McKinney	Guide, etc	2648	4 17
	J. H. Randall	Carpenter work	2649	56 00
	W. Morelan	"	2650	18 25
	Andrew Spittal	Departmental work	2651	29 49
	H. C. Price	Express and postage	2652	5 00
	B. B. Wells	Student labor	2653	6 50
	F. W. Arnold	"	2654	1 35
	A. H. Lyon	"	2655	4 05
	T. A. Panter	Janitor work	2656	6 53
	M. C. Hunter	"	2657	6 90

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
April 4	Hattie Hoffman	Work in library	2658	$4 00
	Mason Snow	"	2659	9 95
	Mabel Huddleson	"	2660	10 00
	S. N. Young	"	2661	10 60
	J. W. Shaw	"	2662	10 30
	Gretchen Miller	"	2663	4 50
	West. Union Tel. Co.	Telegrams	2664	95
	Grace Young	Work in library	2665	4 00
	Max Morse	History of England	2666	8 00
	R. R. Harkins	Drafting	2667	90
	E. G. Bailey	Labor	2668	9 68
	M. W. Mumma	"	2669	1 25
	E. E. Nobles	Drafting	2670	11 00
	C. P. Linhart	Department supplies	2671	3 00
	C. B. Frederick	Anatomy horses	2672	10 50
	F. R. Kunkle	Work in laboratory	2673	5 25
	F. C. Clark	Department supplies	2674	1 88
	Arthur Geren	Drawing paper	2675	46 85
	E. L. Orndorf	Guide	2676	4 12
	W. A. Hite	"	2677	5 38
	A. McLaughlin	Clerical work	2678	1 35
	Helen Powell	"	2679	1 35
	Grace Eagleson	"	2680	2 40
	F. C. Long	Guide	2681	3 50
	Roy Thompson	"	2682	6 87
	R. M. Starbuck	Plumbing charts	2683	3 00
	J. R. Smith	Expressage	2684	1 85
	E. D. West	Roman coins	2685	2 00
	W. L. Redrow	Lab. asst	2686	15 35
	C. P. Linville	"	2687	5 00
	C. L. Sackett	Adv. in Lantern	2688	58 67
	R. W. Funk	Work in store room	2689	22 50
	Jacob Slyh	Labor	2690	4 50
	Gustav Bruder	Band instruction	2691	20 00
	J. A. Beer	Lab. asst	2692	3 10
	J. S. Hine	Lab. supplies & expen's	2693	14 85
	J. C. Perry	Campus work	2694	3 90
	Warren Severn	"	2695	2 80
	J. N. Bradford	Drawing materials	2696	1 50
	R. E. McIntosh	Wiring, etc.	2697	3 25
	H. B. Kinnear	Wiring	2698	12 15
	Richard Spencer	Wheeling coal	2699	42 00
	W. H. Watters	"	2700	36 00
	C. H. Woodruff	Muslin and hooks	2701	86
	Standard Oil Co.	Oil and gasoline	2702	54 76
	Erner & Hopkins	Electrical supplies	2703	14 31
	Spahr & Glenn	Printing	2704	32 00
	J. S. Abbott & Co.	Hardware	2705	3 55
	Hann & Adair	Printing	2706	9 50
	Kauffman, Lattimer Co.	Drugs and sundries	2707	132 56
	J. S. Maclean	Case, brackets, etc.	2708	20 50
	Tallmadge Hdw. Co.	Hardware	2709	54 03
	Schoedinger, F'rn & Co.	"	2710	30 23
	Kelton & Converse	Lumber	2711	67 97
	Col. Mill & Mine S. Co.	Waste and lamps	2718	28 33
	Harper Illustrating Co.	Half tone work	2713	11 85
	Domestic Laundry	Towel service	2714	23 72
	Penna. Fuel Co.	Coal	2715	21 50
	Champlin Printing Co.	Printing	2716	234 55
	Franklin Toil. Sup. Co.	Towel service	2717	4 80
	E. Doddington & Co.	Lumber, etc.	2718	51 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
April 4	Col. Supply Co.	Supplies	2719	$27 57
	R. A. McClure.	Lumber	2720	87 95
	Bucher Eng. Co.	Half tone, etc.	2721	22 78
	L. B. Wing.	Trustee expenses	2722	13 50
	J. W. Beach.	Salary for March	2723	60 00
	Wm. Cannan	Store room supplies.	2724	15 50
	Murray City Coal Co.	Coal	2725	722 00
	Nitschke Bros	Printing	2726	9 60
	Kimball & Mathews.	Supplies	2727	1 00
	Cap. City Mchn. Wks.	Steel rods, etc.	2728	9 26
	J. M. & W. Westwater.	Chandeliers, etc.	2729	109 25
	Payne-McD. Hdw. Co.	Hardware	2730	13 40
	McClelland & Co.	Supplies	2731	3 98
	E. E. Corwin.	Claim of Col. Seed Co.	2732	43 75
	Jeffrey Mfg. Co.	Red rope ins. paper.	2733	3 50
	Walter L. Lillie & Co.	Merchandise and frames	2734	4 00
	Logan McCormick.	Frames	2735	6 00
	The H. Cole Co.	Thumb tacks	2736	3 00
	Seraphim B. B. Co.	Binding	2737	58 05
	H. H. Walling.	Painting and scraping.	2738	18 15
	Eldridge & Higgins Co.	Jars	2739	5 25
	Moonstone Copy. Sl. Co.	Filling and ink	2740	1 45
	P. Hayden S. & Hd. Co.	Cube castings	2741	6 79
	Col. Gas Co.	Coke	2742	6 65
	James P. Carlisle.	Plaster and cement.	2743	5 10
	H. W. Johns Mfg. Co.	One gallon No. 56 paint.	2744	1 50
	Burgess Sold. Furn. Co.	Repairing	2745	3 30
	Palmer & Beck.	Tin	2746	3 00
	H. Braun Sons & Co.	Plumbago	2747	80
	Lynas Bros	Candles	2748	2 70
	Eaton Machine Works.	Iron pieces, etc.	2749	4 81
	Lewis Fink	Picture rail	2750	1 80
	Andrew Dobbie	Cotton	2751	2 40
	D. H. Derflinger.	Gasoline	2752	7 00
	Z. L. White & Co.	Dry goods	2753	3 48
	Dunn, Taft & Co.	Muslin, etc.	2754	1 36
	Scioto Boiler Works.	Boiler tube, etc.	2755	7 00
	Eimer & Amend.	Chemicals, etc.	2756	28 60
	Amer. Dist. Tel. Co.	Box rent	2757	26 00
	Webb Sta. & Ptg. Co.	Office supplies	2758	22 00
	Burrows Bros. Co.	Books	2759	91 84
	G. E. Stechert.	"	2760	234 04
	Henry Troemner	Riders	2761	1 92
	Baker & Adamson Co.	Chemicals	2762	14 84
	J. Carbutt	Plates	2763	124 24
	Chic. Lab. Sup. & S. Co.	Apparatus	2764	32 40
	E. H. Sargent & Co.	Machine lead, etc.	2765	51 00
	W. W. Whiton.	Eight bush. potatoes.	2766	8 00
	U. S. Elec. Supply Co.	Telegraph receiver.	2767	26 00
	Gregory Elec. Co.	Water meter	2768	15 15
	Nicholson File Co.	Files	2769	22 73
	The Strelinger Co.	Hutler dado head.	2770	10 80
	G. H. Kearney.	Journals	2771	62 50
	The Boston Book Co.	Books	2772	103 00
	Boston Book Bind. Co.	Binder	2773	1 15
	H. H. Ballard.	Klips	2774	3 12
	T. C. Trueblood.	N. A. E. reports.	2775	2 00
	Torrey Bot. Club.	Memoirs, Vol. 6 and 7.	2776	6 00
	E. L. Field.	Cards	2777	20 70
	R. R. Bowker.	Catalogues	2778	5 00
	E. M. Knowles.	Stilts and pins.	2779	75

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
April 4	W. & L. E. Gurley....	Sketching case.....	2780	$38 00
	Edward Thompson Co..	Encyclopedia	2781	6 00
	W. H. Anderson & Co..	Reports, law	2782	7 00
	W. H. Johns Mfg. Co..	Half gallon paint.....	2783	1 50
	The Gunton Co.....	Magazine, etc.....	2784	11 20
	J. R. Palmenberg's Sons.	Display fixtures, etc....	2785	18 60
	Rand, McNally & Co...	Keeps Ancient Greece...	2786	8 80
	P. P. Caproni & Bro...	Busts	2787	11 05
	C. H. Evans & Co.....	Advertisement	2788	5 00
	W. J. Holland.....	Butterfly book	2789	3 00
	A. E. Adair.....	Mason work	2790	4 05
	Lily Weeks	Janitress	2791	5 00
	H. J. McTeague.....	Estimate, etc	2792	520 25
	Col. Gas Co.....	March gas	2793	160 20
	Eimer & Amend.....	Hydrometer, etc.....	2794	6 31
16	Adams-Bagnall Elec. Co.	Outer globes	2795	6 00
	F. H. McAllister.....	Plain sildes	2796	5 20
	Herman Haerlein	Services	2797	29 20
	Col. Water Works.....	Water rents	2798	797 11
	Bucher Eng. Co.....	Half tone work.....	2799	3 00
	J. S. Abbott & Co.....	Locks and bolts	2800	2 42
	Lily Weeks	Janitress work	2801	5 00
	R. M. Rownd, P. M....	400 4c stamps	2802	16 00
	R. M. Rownd, P. M....	Postage stamps	2803	19 50
28	Thos. F. Hunt.....	Salary, April, 1900....	2804	250 00
	W. D. Gibbs.....	" "	2805	160 00
	J. W. Decker.....	" "	2806	140 00
	Frank Ruhlen	" "	2807	60 00
	H. A. Weber.....	" "	2808	225 00
	A. E. Vinson.....	" "	2809	80 00
	G. W. Knight.....	" "	2810	250 00
	J. B. Sanborn.....	" "	2811	70 00
	A. M. Bleile.....	" "	2812	225 00
	C. B. Morrey.....	" "	2813	100 00
	M. Dresbach	" "	2814	30 00
	H. C. Lord.....	" "	2815	160 00
	W. A. Kellerman.....	" "	2816	225 00
	J. H. Schaffner.....	" "	2817	100 00
	S. W. Collett.....	" "	2818	25 00
	Alice Dufour	" "	2819	25 00
	F. K. Luke.....	" "	2820	50 00
	Wm. McPherson	" "	2821	225 00
	S. A. Norton.....	" "	2822	120 00
	W. E. Henderson.....	" "	2823	100 00
	D. A. Kohr.....	" "	2824	60 00
	H. C. Gore.....	" "	2825	30 00
	J. F. Jeffrey.....	" "	2826	10 00
	C. N. Brown.....	" "	2827	225 00
	C. E. Sherman.....	" "	2828	110 00
June 16	F. K. Luke.....	Salary, June, 1900.....	2829	50 00
April 28	Edward Orton, Jr.....	Salary, April, 1900....	2830	180 00
	A. V. Bleininger.....	" "	2831	40 00
	Perla G. Bowman.....	" "	2832	140 00
	C. P. Souther.....	" "	2833	80 00
	J. N. Bradford.....	" "	2834	180 00
	T. E. French.....	" "	2835	110 00
	T. K. Lewis.....	" "	2836	60 00
	J. H. Vosskuehler.....	" "	2837	30 00
	Silas Martin	" "	2838	50 00
	F. C. Clark.....	" "	2839	160 00
	Grace Pitts.....	" "	2840	30 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
April 28	J. P. Gordy	Salary, April, 1900	2841	$225 00
	F. C. Caldwell	" "	2842	160 00
	F. A. Fish	" "	2843	60 00
	J. P. Covan	" "	2844	70 00
	A. C. Barrows	" "	2845	225 00
	J. R. Taylor	" "	2846	110 00
	W. H. Siebert	" "	2847	135 00
	J. A. Bownocker	" "	2848	100 00
	C. S. Prosser	" "	2849	150 00
	W. C. Mills	" "	2850	35 00
	E. A. Eggers	" "	2851	225 00
	C. W. Mesloh	" "	2852	110 00
	E. H. Moore	" "	2853	20 00
	J. R. Smith	" "	2854	225 00
	A. W. Hodgman	" "	2855	110 00
	W. R. Lazenby	" "	2856	225 00
	H. C. Price	" "	2857	50 00
	F. E. Sanborn	" "	2858	200 00
	W. A. Knight	" "	2859	100 00
	C. P. Crowe	" "	2860	80 00
	W. H. Renck	" "	2861	85 00
	A. H. McIntire	" "	2862	30 00
	S. C. Derby	" "	2863	225 00
	J. W. Beach	" "	2864	60 00
	W. F. Hunter	" "	2865	250 00
	J. H. Collins	" "	2866	20 00
	J. A. Shauck	" "	2867	17 50
	E. B. Kinkead	" "	2868	120 00
	W. H. Page	" "	2869	140 00
	E. O. Randall	" "	2870	70 00
	D. F. Pugh	" "	2871	95 00
	O. B. Jones	" "	2872	135 00
	H. N. Townshend	" "	2873	55 00
	Gertrude Kellicott	" "	2874	55 00
	Maude Jeffrey	" "	2875	55 00
	Lucy Allen	" "	2876	55 00
	C. B. Guittard	" "	2877	55 00
	R. D. Bohannon	" "	2878	225 00
	G. W. McCoard	" "	2879	160 00
	C. L. Arnold	" "	2880	100 00
	K. D. Swartzel	" "	2881	100 00
	E. L. Ball	" "	2882	30 00
	J. W. Young	" "	2883	30 00
	C. L. E. Moore	" "	2884	10 00
	W. T. Magruder	" "	2885	225 00
	E. A. Hitchcock	" "	2886	150 00
	F. J. Hale	" "	2887	30 00
	C. A. Grate	" "	2888	30 00
	A. F. Hall	" "	2889	60 00
	F. A. Ray	" "	2890	200 00
	N. W. Lord	" "	2891	200 00
	E. E. Somermeier	" "	2892	70 00
	G. B. Kauffman	" "	2893	200 00
	W. A. Landacre	" "	2894	70 00
	E. E. Harrold	" "	2895	90 00
	N. P. Oglesby	" "	2896	40 00
	W. H. Scott	" "	2897	225 00
	F. M. Hamilton	" "	2898	80 00
	C. P. Linhart	" "	2899	160 00
	S. E. Canfield	" "	2900	75 00
	D. C. Huddleson	" "	2901	50 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
April 28	B. F. Thomas	Salary, April, 1900	2902	$225 00
	J. E. Boyd	" "	2903	120 00
	F. E. Kester	" "	2904	80 00
	H. W. Brown	" "	2905	25 00
	J. V. Denny	" "	2906	225 00
	W. L. Graves	" "	2907	100 00
	G. H. McKnight	" "	2908	90 00
	H. C. Allen	" "	2909	115 00
	J. B. Parker	" "	2910	30 00
	B. L. Bowen	" "	2911	225 00
	C. A. Bruce	" "	2912	100 00
	C. F. Dowd	" "	2913	20 00
	D. S. White	" "	2914	160 00
	W. F. Lavery	" "	2915	70 00
	C. B. Frederick	" "	2916	70 00
	O. V. Brumley	" "	2917	50 00
	Herbert Osborn	" "	2918	225 00
	J. S. Hine	" "	2919	85 00
	F. L. Landacre	" "	2920	85 00
	W. O. Thompson	" "	2921	416 67
	Alexis Cope	" "	2922	187 50
	Carl E. Steeb	" "	2923	60 00
	E. D. Cockins	" "	2924	58 33
	E. R. Hubler	" "	2925	33 33
	K. H. Duncan	" "	2926	54 17
	W. C. McCracken	" "	2927	150 00
	C. W. Low	" "	2928	54 17
	W. A. Standley	" "	2929	50 00
	B. LeBay	" "	2930	50 00
	T. Boude	" "	2931	45 00
	W. H. Case	" "	2932	45 00
	Marion Peck	" "	2933	40 00
	G. R. Rose	" "	2934	65 00
	Jos. Garrettson	" "	2935	37 39
	B. Irwin	" "	2936	45 00
	J. C. Perry	" "	2937	12 50
	G. A. Goodspeed	" "	2938	40 00
	R. E. McIntosh	" "	2939	12 50
	D. D. Geren	" "	2940	40 00
	T. E. Osborn	" "	2941	40 00
	Wm. Whitestine	" "	2942	40 00
	G. C. Denney	" "	2943	40 00
	E. G. Bailey	" "	2944	15 00
	A. G. McCall	" "	2945	27 00
	M. N. Cook	" "	2946	40 00
	W. Conklin	" "	2947	40 00
	H. Chantler	" "	2948	40 00
	A. Chantler	" "	2949	45 00
	Earl Conway	" "	2950	20 00
	J. Kelley	" "	2951	25 00
	W. C. Weir	" "	2952	20 00
	W. Townsel	" "	2953	25 00
	J. H. Brown	" "	2954	15 00
	J. H. Brown	" "	2955	25 00
June 16	W. C. Weir	Salary June 1900	2956	20 00
April 28	W. E. Mann	Salary, April, 1900	2957	25 00
	C. H. Woodruff	" "	2958	65 00
20	A. Douglas, Admr	Settlement Kendrick case	2959	4,000 00
	N. W. Evans	Settlement Evans case	2960	753 04
	C. F. Galloway, clerk	Costs in Evans case	2961	246 96
23	Lily Weeks	Salary	2962	5 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
April 23	Nitschke Bros.	Letter heads	2963	$3 00
26	R. M. Rownd	Stamps	2964	16 00
27	Mrs. M. J. Kellenberger	Salary	2965	25 00
May 1	Lily Weeks	Janitress	2966	5 00
	L. B. Wing	Expense as trustee	2967	6 00
	R. M. Rownd	Postage deposit	2968	10 00
4	Chicago Lab. S. S. Co.	Instruments and supplies	2969	215 55
2	L. C. Ferrell	Public documents	2970	240 00
3	Bausch & Lomb Co.	Condenser	2971	1 09
	Crosby Steam Gauge Co.	Valve and springs	2972	8 58
	Eimer & Amend	Chemicals	2973	9 23
	G. E. Stechert	Books	2974	78 61
	Maher & Grosh Cut. Co.	Cutlery	2975	6 46
	Emil Greiner	Apparatus and tubes	2976	15 20
	E. H. Sargent & Co.	Supplies	2977	32 85
	J. Carbutt	Photo supplies	2978	1 48
	Gen. Electric Co.	Electrical appliances	2979	10 10
	Albaugh Nursery Co.	Trees	2980	19 00
	Open Court Pub. Co.	Portraits, etc	2981	12 00
	G. B. Carpenter Co.	Tents	2982	211 99
	Boston Book Co.	Books	2983	97 31
	W. H. Anderson & Co.	Digests	2984	139 75
	Am. Inst. Elec. Eng.	Subscription	2985	5 00
	Am. Pharm. Assn.	Proceedings vol. 47	2986	5 50
	Am. Jour. of Physiology	Volume 15	2987	5 00
	Library Bureau	Library supplies	2988	16 57
	N. Y. Botanical Garden.	Journals, etc	2989	5 25
	H. E. Hooper	Century atlas	2990	11 50
	Burrows Bros. Co.	Books	2991	184 67
	E. A. Kinsey Co.	Slide	2992	3 00
	Thomas Mehan & Sons.	Trees	2993	109 95
	DeLaval Sep. Co.	Points and belts	2994	4 50
	Creamery Package Co.	Dairy supplies	2995	45 87
	Cornish, Curtis & G. Co.	Cheese molds	2996	5 00
	Wellington Box Co.	Boxes	2997	4 00
	D. H. Burrell & Co.	Nut for Hood gang pr'ss	2998	2 00
	Keuffel & Esser Co.	Mining target	2999	72 00
	Wm. Gartner & Co.	Spherometer, etc	3000	22 00
	Queen & Co.	Bridge and tubes	3001	124 05
	Babcock & Wilcox Co.	Boiler tubes	3002	34 10
	D. C. Heath & Co.	Books	3003	1 34
	J. G. Biddle	Instruments	3004	25 58
	Fidelity Int. Agency.	Miner's safety lamp	3005	4 40
	T. A. Randall & Co.	Vitrified paving brick	3006	1 00
	Christy Fire Clay Co.	Clay	3007	4 63
	U. S. Encaustic Tile Co.	Tiles	3008	13 79
	G. W. Carman	Membership N. C. A. C.	3009	3 00
	F. H. Newell	Lecture	3010	15 00
	India Alkali Works.	Savogran and oil soap	3011	26 27
	C. W. Pomeroy	Stationery	3012	3 50
	Jos. E. Wing	Lecture expenses	3013	4 40
	Wilbert Morelan	Carpentry	3014	4 25
	Honline & West	Books	3015	36 30
	J. H. Randall	Carpentry	3016	46 00
	W. L. Redrow	Lab. assistance	3017	2 25
	O. S. Marckworth	Laboratory work	3018	21 40
	H. C. Price	Department supplies	3019	7 50
	F. C. Clark	Drawing materials	3020	1 75
	S. W. Young	Library work	3021	9 65
	C. H. Woodruff	Piece iron	3022	15
	Mabel Huddleson	Library work	3023	10 50

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
May 3	Christ Trappe	One bay horse	3024	$100 00
	J. W. Shaw	Work in law library	3025	9 70
	Mason Snow	Work in law library	3026	9 90
	Thos. A. Panter	Janitor	3027	10 58
	J. G. Sterling	Student labor	3028	1 31
	O. I. Dick	"	3029	2 93
	F. W. Arnold	Assistance	3030	8 55
	T. V. Stires	Work on campus	3031	1 75
	L. P. McAllister	"	3032	1 25
	A. E. Day	Student labor	3033	1 25
	Morris Bugby	Work on campus	3034	2 18
	Blain Galloway	"	3035	7 18
	J. C. Perry	"	3036	18 10
	John Frank	"	3037	4 59
	Edith Seymour	Piano, gym	3038	5 50
	Helen Potts	" "	3039	11 25
	E. G. Bailey	Department labor	3040	8 20
	F. J. Hale	"	3041	7 85
	M. L. Seymour	Clerical work	3042	3 00
	H. C. Nidy	Blue printing	3043	30
	E. A. Hitchcock	Cash advanced	3044	31 50
	Richard Spencer	Wheeling coal	3045	7 50
	Edward Orton, Jr.	Cash advanced	3046	36 75
	G. W. Schubert	Guide	3047	2 38
	F. C. Long	"	3048	4 75
	E. L. Orndorf	"	3049	4 50
	Roy Thompson	"	3050	3 63
	Arthur Geren	Instruments	3051	9 09
	F. C. McKinney	Guide	3052	3 88
	Tallmadge Hdw. Co.	Hardware	3053	21 40
	McClelland & Co.	Office supplies	3054	5 80
	Schoedinger, F'rn & Co.	Hardware	3055	67 49
	Col. Supply Co.	Supplies	3056	50 42
	Blackwood, Green & Co.	Pipe and hardware	3057	10 61
	Col. M. & M. Supply Co	Valves, etc	3058	54 78
	Kelton & Converse	Lumber	3059	21 57
	Hann & Adair	Envelopes, etc	3060	13 10
	Domestic Laundry	Washing towels	3061	22 72
	H. Braun Sons & Co.	Supplies	3062	13 23
	Troy Laundry Co.	Washing curtains	3063	70
	Standard Oil Co.	Renown engine oil	3064	9 45
	Tracy-Wells Co	Sundries	3065	27 90
	Hester Getz	Cardboard	3066	1 75
	Eva Tipton	Stenographic work	3067	2 80
	Osborn, Will's. & Horn	Coal	3068	32 72
	J. P. Carlisle	Plaster	3069	2 50
	Ohio State Journal Co.	Advertisement	3070	13 12
	Spahr & Glenn	Printing	3071	6 50
	Hanna Paint Mfg. Co.	White lead	3072	11 05
	Haydenville M. & M. Co.	Fire clay	3073	5 63
	F. O. Schoedinger	Can and faucet	3074	2 50
	Borger Bros	Cylinder	3075	4 50
	B. D. Potts	Pipe	3076	2 90
	Columbus Gas Co.	Coke	3077	12 69
	Wm. Burdell, Jr.	Hobbles, etc	3078	5 75
	E. C. Livenspire	"	3079	1 20
	Col. Wire & Iron Wks.	Partitions, etc	3080	15 00
	M. P. Streett	Brickwork	3081	500 00
	Brust & Bauch	Masonry	3082	85 00
	B. G. Kalb	Stenographic work	3083	3 00
	Blanche DeLong	" "	3084	1 87

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
May 2	Smith Bros. Hdw. Co..	Emery, etc.....	3085	$1 30
	F. J. Heer.....	Electros of map.....	3086	2 00
	G. Drobisch	Shrubs	3087	2 50
	Hall-Collins Hdw. Co...	LePages glue	3088	2 00
	I. H. Miller.....	Notarial work	3089	4 00
	James Penn	Hauling	3090	3 45
	Seraphim B. B. Co.....	Binding	3091	37 85
	Val Loewer	Range	3092	36 00
	The H. Cole Co.....	Drawing materials	3093	3 20
	Payne-McD. Hdw. Co..	Glass	3094	3 25
	Livingston Seed Co.....	Seeds	3095	1 60
	Erner & Hopkins.....	Wire	3096	1 65
	J. S. Abbott & Co.....	Hardware	3097	1 40
	Robert A. McClure.....	Table and lumber.....	3098	49 22
	Champlin Printing Co..	Printing	3099	75 25
	Hager & Graves.....	Groceries	3100	32 97
	The Alpha Dairy Co....	Milk tickets	3101	1 10
	Busy Bee C. K. Co.....	Supplies	3102	1 40
	Kimball & Mathews....	"	3103	6 55
	Kauffman-Lattimer Co..	Drugs and sundries....	3104	350 85
	P. Hayden Sad. Hd. Co.	Iron	3105	9 35
	Engelke & Bigelow.....	Freight and cartage.....	3106	72 35
	Columbus Gas Co.....	April gas	3107	169 80
	Engelke & Bigelow.....	Freight, etc.....	3108	27 20
	H. J. McTeague.....	Est. astron'rs. residence.	3109	465 85
	C. H. Davis.....	Two machines	3110	70 00
	R. M. Rownd, P. M....	Postage stamps	3111	15 00
	John T. Mack.....	Expenses as trustee....	3112	42 25
	Lily Weeks	Janitress	3113	5 00
	Bucher Engraving Co..	Half tone work.....	3114	31 25
	Bucher Engraving Co..	" "	3115	3 00
	J. McLain Smith.....	Trustee expenses	3116	22 90
	R. M. Rownd, P. M....	Deposit, pound postage	3117	10 00
	F. J. Tyler.....	Salary for April.....	3118	25 00
	Helen Powell.....	Clerical work	3119	2 00
	E. E. Nobles.....	Drafting	3120	12 50
	W. Townsel	Salary, May, 1900.....	3121	25 00
	W. C. Weir.....	" "	3122	20 00
	C. H. Woodruff.....	" "	3123	65 00
	W. E. Mann.....	" "	3124	25 00
	Earl Conway	Salary, June, 1900.....	3125	20 00
	James Kelley	Salary, May, 1900.....	3126	25 00
	Earl Conway	" "	3127	20 00
	A. Chantler	" "	3128	45 00
	H. Chantler	" "	3129	40 00
	M. N. Cook.....	" "	3130	40 00
	A. G. McCall.....	" "	3131	27 00
	E. G. Bailey.....	" "	3132	15 00
	G. C. Denny.....	" "	3133	40 00
	William Whitestine	" "	3134	40 00
	J. H. Brown.....	" "	3135	15 00
	J. H. Brown.....	" "	3136	25 00
	T. E. Osborn.....	" "	3737	40 00
	D. D. Geren.....	" "	3138	40 00
	R. E. McIntosh.....	" "	3139	12 50
	G. A. Goodspeed.....	" "	3140	40 00
	J. C. Perry.....	" "	3141	12 50
	Benj. Irwin	" "	3142	45 00
	J. R. Garrettson.....	" "	3143	37 39
26	Geo. R. Rose.....	" "	3144	65 00
	Marion Peck	" "	3145	40 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
May 26	W. H. Case	Salary, May, 1900	3146	$45 00
	T. M. Boude	" "	3147	45 00
	Benj. LeBay	" "	3148	50 00
	W. A. Standley	" "	3149	50 00
	Chas. M. Low	" "	3150	54 17
	W. C. McCracken	" "	3151	150 00
	K. H. Duncan	" "	3152	54 17
	E. R. Hubler	" "	3153	33 33
22	E. D. Cockins	" "	3154	58 33
	Carl E. Steeb	" "	3155	60 00
	Alexis Cope	" "	3156	187 50
26	W. O. Thompson	" "	3157	416 67
	F. L. Landacre	" "	3158	85 00
	J. S. Hine	" "	3159	85 00
	Herbert Osborn	" "	3160	225 00
	O. V. Brumley	" "	3161	50 00
	C. B. Frederick	" "	3162	70 00
	W. F. Lavery	" "	3163	70 00
	D. S. White	" "	3164	160 00
	Chas. F. Dowd	" "	3165	20 00
	C. A. Bruce	" "	3166	100 00
	B. L. Bowen	" "	3167	225 00
	J. B. Parker	" "	3168	30 00
	H. C. Allen	" "	3169	115 00
	G. H. McKnight	" "	3170	90 00
	W. L. Graves	" "	3171	100 00
	J. V. Denney	" "	3172	225 00
	H. W. Brown	" "	3173	25 00
	F. E. Kester	" "	3174	80 00
	J. E. Boyd	" "	3175	120 00
	B. F. Thomas	" "	3176	225 00
	D. C. Huddleson	" "	3177	50 00
	S. E. Canfield	" "	3178	75 00
	C. P. Linhart	" "	3179	160 00
	F. M. Hamilton	" "	3180	80 00
	W. H. Scott	" "	3181	225 00
	N. P. Oglesby	" "	3182	40 00
	E. E. Harrold	" "	3183	90 00
	W. A. Landacre	" "	3184	70 00
	G. B. Kauffman	" "	3185	200 00
	E. E. Somermeier	" "	3186	70 00
	N. W. Lord	" "	3187	200 00
	F. A. Ray	" "	3188	200 00
13	Lily Weeks	Janitress	3189	5 00
26	A. F. Hall	Salary, May, 1900	3190	60 00
	C. A. Grate	" "	3191	30 00
	F. J. Hale	" "	3192	30 00
	E. A. Hitchcock	" "	3193	150 00
	Wm. F. Magruder	" "	3194	225 00
	C. L. E. Moore	" "	3195	10 00
	J. W. Young	" "	3196	30 00
	E. L. Ball	" "	3197	30 00
	K. D. Swartzel	" "	3198	100 00
	C. L. Arnold	" "	3199	100 00
	G. W. McCoard	" "	3200	160 00
	R. D. Bohannon	" "	3201	225 00
	C. B. Guittard	" "	3202	55 00
	Lucy Allen	" "	3203	55 00
	Maude Jeffrey	" "	3204	55 00
	Gertrude Kellicott	" "	3205	55 00
	H. N. Townshend	" "	3206	55 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
May 26	O. B. Jones	Salary, May, 1900	3207	$135 00
	D. F. Pugh	" "	3208	95 00
	E. O. Randall	" "	3209	70 00
	W. H. Page	" "	3210	140 00
	E. B. Kinkead	" "	3211	120 00
	J. S. Shauck	" "	3212	17 50
	J. S. Collins	" "	3213	20 00
	W. F. Hunter	" "	3214	250 00
	J. W. Beach	" "	3215	60 00
	S. C. Derby	" "	3216	225 00
	A. H. McIntire	" "	3217	30 00
	W. H. Renck	" "	3218	85 00
	C. P. Crowe	" "	3219	80 00
	W. A. Knight	" "	3220	100 00
	F. E. Sanborn	" "	3221	200 00
	H. C. Price	" "	3222	50 00
	W. R. Lazenby	" "	3223	225 00
	A. W. Hodgman	" "	3224	100 00
	J. R. Smith	" "	3225	225 00
	E. H. Moore	" "	3226	20 00
	C. W. Mesloh	" "	3227	110 00
	E. A. Eggers	" "	3228	225 00
	W. C. Mills	" "	3229	35 00
	C. S. Prosser	" "	3230	150 00
	J. A. Bownocker	" "	3231	100 00
	W. H. Siebert	" "	3232	135 00
	J. R. Taylor	" "	3233	110 00
	A. C. Barrows	" "	3234	225 00
	J. P. Covan	" "	3235	70 00
	F. A. Fish	" "	3236	60 00
	F. C. Caldwell	" "	3237	160 00
	J. P. Gordy	" "	3238	225 00
	Grace Pitts	" "	3239	30 00
	F. C. Clark	" "	3240	160 00
	Silas Martin	" "	3241	50 00
	J. H. Vosskuehler	" "	3242	30 00
	T. K. Lewis	" "	3243	60 00
22	T. E. French	" "	3244	110 00
26	J. N. Bradford	" "	3245	180 00
	C. P. Souther	" "	3246	80 00
	Perla G. Bowman	" "	3247	140 00
	A. V. Bleininger	" "	3248	40 00
	Edw. Orton, Jr	" "	3249	180 00
	C. E. Sherman	" "	3250	110 00
	C. N. Brown	" "	3251	225 00
	J. F. Jeffrey	" "	3252	10 00
	H. C. Gore	" "	3253	30 00
	D. A. Kohr	" "	3254	60 00
	W. E. Henderson	" "	3255	100 00
	S. A. Norton	" "	3256	120 00
	Wm. McPherson	" "	3257	225 00
	F. K. Luke	" "	3258	50 00
	Alice Dufour	" "	3259	25 00
	S. W. Collett	" "	3260	25 00
	J. H. Schaffner	" "	3261	100 00
	W. A. Kellerman	" "	3262	225 00
	H. C. Lord	" "	3263	160 00
	M. Dresbach	" "	3264	30 00
	C. B. Morrey	" "	3265	100 00
	A. M. Bleile	" "	3266	225 00
	J. B. Sanborn	" "	3267	70 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
May 26	G. W. Knight	Salary, May, 1900	3268	$250 00
	A. E. Vinson	" "	3269	80 00
	H. A. Weber	" "	3270	225 00
	Frank Ruhlen	" "	3271	60 00
	J. W. Decker	" "	3272	140 00
	Wm. D. Gibbs	" "	3273	160 00
	T. F. Hunt	" "	3274	250 00
	W. Conklin	" "	3275	40 00
	F. J. Tyler	" "	3276	25 00
21	N. P. Oglesby	Return fees	3277	6 00
	R. M. Rownd, P. M.	Pound postage deposit.	3278	10 00
	Lily Weeks	Janitress	3279	5 00
	U. S. Mort & Trust Co.	6 mo. int. on $100,000 4½% bonds, due June 1st, 1900	3280	2,250 00
June 1	Hayden-Clinton Nat. Bk.	6 mo. int. on $170,000 4½% bonds, due June 1, 1900	3281	3,825 00
	Hayden-Clinton Nat. Bk.	6 mo. int. on $60,000 6% bonds, due June 1, 1900	3282	1,800 00
	Hayden-Clinton Nat. Bk.	Redpn. of $10,000 cert's. No. 51-60, due June 1 1900	3283	10,000 00
May 23	B. S. Stephenson	Quartermaster service	3284	5 00
	Rollo S. Frame	Return fees	3285	15 00
28	U. S. Mort. & Trust Co.	Exchange on order 3280	3286	2 25
	Lily Weeks	Salary, one week	3287	4 00
	R. M. Rownd, P. M.	Pound postage	3288	10 00
June 1	R. M. Rownd	Stamps	3289	35 00
	M. J. Kellenberger	Services dom. economy.	3290	20 00
	Lily Weeks	Janitress	3291	3 00
	Nathaniel Reed	Guide	3292	2 07
4	R. M. Rownd, P. M.	Postal cards, etc.	3293	15 00
	G. H. McKnight	Salary, June, 1900	3294	90 00
16	T. F. Hunt	" "	3295	250 00
	W. D. Gibbs	" "	3296	160 00
	J. W. Decker	" "	3297	140 00
	Frank Ruhlen	" "	3298	60 00
	H. A. Weber	" "	3299	225 00
	A. E. Vinson	" "	3300	80
	G. W. Knight	" "	3301	250 00
5	J. B. Sanborn	" "	3302	70 00
16	A. M. Bleile	" "	3303	225 00
	C. B. Morrey	" "	3304	100 00
	M. Dresbach	" "	3305	30 00
	H. C. Lord	" "	3306	160 00
	W. A. Kellerman	" "	3307	225 00
	J. H. Schaffner	" "	3308	100 00
	S. W. Collett	" "	3309	25 00
	Alice Dufour	" "	3310	25 00
	W. McPherson	" "	3311	225 00
	S. A. Norton	" "	3312	120 00
	W. E. Henderson	" "	3313	100 00
	D. A. Kohr	" "	3314	60 00
	H. C. Gore	" "	3315	30 00
	J. F. Jeffrey	" "	3316	10 00
	C. N. Brown	" "	3317	225 00
	C. E. Sherman	" "	3318	110 00
	Edw. Orton, Jr.	" "	3319	180 00
	A. V. Bleininger	" "	3320	40 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
June 16	P. G. Bowman	Salary, June, 1900	3321	$140 00
	P. G. Souther	" "	3322	80 00
	J. N. Bradford	" "	3323	180 00
	T. E. French	" "	3324	110 00
	T. K. Lewis	" "	3325	60 00
9	J. H. Vosskuehler	" "	3326	30 00
	S. Martin	" "	3327	50 00
7	F. C. Clark	" "	3328	160 00
16	Grace Pitts	" "	3329	30 00
	J. P. Gordy	" "	3330	225 00
	F. C. Caldwell	" "	3331	160 00
	F. A. Fish	" "	3332	60 00
	J. P. Covan	" "	3333	70 00
13	A. C. Barrows	" "	3334	225 00
16	J. R. Taylor	" "	3335	110 00
	W. H. Siebert	" "	3336	135 00
14	J. A. Bownocker	" "	3337	100 00
16	C. S. Prosser	" "	3338	150 00
13	W. C. Mills	" "	3339	35 00
11	E. A. Eggers	" "	3340	225 00
14	E. H. Moore	" "	3341	20 00
16	C. W. Mesloh	" "	3342	110 00
	J. R. Smith	" "	3343	225 00
5	A. W. Hodgman	" "	3344	110 00
16	W. R. Lazenby	" "	3345	225 00
	H. C. Price	" "	3346	50 00
	F. E. Sanborn	" "	3347	200 00
	W. A. Knight	" "	3348	100 00
	C. P. Crowe	" "	3349	80 00
	W. H. Renck	" "	3350	85 00
9	A. H. McIntire	" "	3351	30 00
16	S. C. Derby	" "	3352	225 00
	J. W. Beach	" "	3353	60 00
13	W. F. Hunter	" "	3354	250 00
16	J. H. Collins	" "	3355	20 00
	J. H. Shauck	" "	3356	17 50
	E. B. Kinkead	" "	3357	120 00
	W. H. Page	" "	3358	140 00
	E. O. Randall	" "	3359	70 00
	D. F. Pugh	" "	3360	95 00
8	O. B. Jones	" "	3361	135 00
16	H. N. Townshend	" "	3362	55 00
	G. Kellicott	" "	3363	55 00
	Maude Jeffrey	" "	3364	55 00
9	Lucy Allen	" "	3365	55 00
16	C. B. Guittard	" "	3366	55 00
14	R. D. Bohannon	" "	3367	225 00
16	G. W. McCoard	" "	3368	160 00
	C. L. Arnold	" "	3369	100 00
	K. D. Swartzel	" "	3370	100 00
11	Emma Ball	" "	3371	30 00
16	J. W. Young	" "	3372	30 00
	C. L. E. Moore	" "	3373	10 00
	W. T. Magruder	" "	3374	225 00
13	E. A. Hitchcock	" "	3375	150 00
16	F. J. Hale	" "	3376	30 00
	Chas. A. Grate	" "	3377	30 00
	A. F. Hall	" "	3378	60 00
14	F. A. Ray	" "	3379	200 00
16	N. W. Lord	" "	3380	200 00
14	E. E. Somermeier	" "	3381	70 00

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
June 16	G. B. Kauffman	Salary, June, 1900	3382	$200 00
	W. A. Landacre	" " "	3383	70 00
	E. E. Harrold	" " "	3384	90 00
	N. P. Oglesby	" " "	3385	40 00
	W. H. Scott	" " "	3386	225 00
	F. M. Hamilton	" " "	3387	80 00
	C. P. Linhart	" " "	3388	160 00
	S. E. Canfield	" " "	3389	75 00
	D. C. Huddleson	" " "	3390	50 00
14	B. F. Thomas	" " "	3391	225 00
16	J. E. Boyd	" " "	3392	120 00
8	F. E. Kester	" " "	3393	80 00
16	W. L. Graves	" " "	3394	100 00
9	H. C. Allen	" " "	3395	115 00
	J. B. Parker	" " "	3396	30 00
5	H. W. Brown	" " "	3397	25 00
14	J. V. Denney	" " "	3398	225 00
	B. L. Bowen	" " "	3399	225 00
16	C. A. Bruce	" " "	3400	100 00
14	C. F. Dowd	" " "	3401	20 00
16	D. S. White	" " "	3402	160 00
14	W. F. Lavery	" " "	3403	70 00
9	C. B. Frederick	" " "	3404	70 00
14	O. V. Brumley	" " "	3405	50 00
16	H. Osborn	" " "	3406	225 00
9	J. S. Hine	" " "	3407	85 00
13	F. L. Landacre	" " "	3408	85 00
6	H. R. Marietta	Incidental fee	3409	15 00
	C. W. Schubert	Guide service	3410	6 88
	J. H. Randall	Carpentry work	3411	38 25
	W. Morlan	" "	3412	10 51
	J. C. Perry	Campus work	3413	14 40
	F. J. Pavlieck	Guide service	3414	5 50
	Arthur Geren	Drawing supplies	3415	4 68
9	H. J. Hammond	Department supplies	3416	1 32
6	W. C. Smith	Addressing envelopes	3417	1 65
	E. L. Orndorff	Guide services	3418	5 50
	H. L. Dowd	Addressing envelopes	3419	1 66
	C. E. Schumacher	Typewriting	3420	6 20
	S. E. Canfield	Department supplies	3421	2 55
	T. Rickey	Department labor	3422	10 00
	E. Seymour	Accompanying piano	3423	3 50
	H. Potts	Accompanying classes	3424	4 50
	M. Dresbach	Department supplies	3425	6 93
	F. C. Clark	" "	3426	1 05
	W. C. McCracken	Money advanced	3427	2 60
	C. L. Sackett, Mgr.	Adv. in Lantern	3428	58 34
	C. P. Souther	Department supplies	3429	3 00
	F. R. Kunkle	Labor	3430	15 15
	B. B. Wells	"	3431	5 35
	O. I. Dick	"	3432	4 50
	F. W. Arnold	"	3433	11 25
	T. A. Panter	"	3434	11 48
	C. P. Linville	Lab. assistance	3435	6 60
	W. McPherson	Department supplies	3436	1 96
	W. L. Redrow	Labor	3437	2 25
	Laura Hill	Clerical labor	3438	13 00
	Chas. R. Hall	Extra labor	3439	63
	E. G. Bailey	Labor on boilers	3440	13 13
	E. A. Hitchcock	Incidentals	3441	2 77
	J. A. Beer	Lab. assistance	3442	6 30

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
June 6	C. B. Frederick	Dept. supplies	3445	$39 25
	M. L. Seymour	Stenographic work	3443	7 35
	E. E. Nobles	Drafting	3444	1 75
	T. E. Osborne	Cleaning guns	3446	3 50
	T. E. French	Filling out commissions	3447	3 45
	G. Bruder	Band instruction	3448	68 00
	R. W. Funk	Labor in store room	3449	37 87
	A. V. Bleininger	Expenses	3450	4 70
	C. Albin	Guide service	3451	75
	R. F. Abbott	Band service	3452	15 00
	O. P. Cockerill	Expenses orat. contest	3453	21 00
	J. A. Bownocker	Exp. to high school	3454	12 05
	W. O. Thompson	Expenses legislature	3455	5 25
	F. C. Long	Guide service	3456	10 63
	K. H. Duncan	Street car tickets	3457	5 00
	F. C. McKinney	Guide service	3458	5 14
	R. Thompson	" "	3459	8 00
	Helen Powell	Clerical service	3460	1 28
	M. Matthews	Guide service	3461	50
	J. E. Loughrey	Guide service	3462	63
	M. Bugby	Guide and campus work	3463	4 20
	J. Frank	Guide service	3464	1 07
	J. F. Clevinger	Campus work	3465	1 82
	J. Frank	" "	3466	4 75
	F. E. Fleischer	" "	3467	20 62
	M. Snow	Work in library	3468	12 62
	M. Huddleson	" "	3469	13 00
	J. W. Shaw	Work in law library	3470	12 00
	S. N. Young	" "	3471	11 85
	Honline & West	Books	3472	9 47
16	Kauffman-Lattimer Co.	Drugs and sundries	3473	294 33
8	H. J. McTeague	Estimate No. 3 as res	3474	1,263 21
16	F. A. Stallman	Trunk hardware	3475	6 36
	Payne-McD. Hdw. Co.	Hardware	3476	32 10
	New Col. Bridge Co.	Beams and stirrups	3477	11 21
	Kimball & Matthews	Drawing supplies	3478	13 50
	Col. Plate & W. Glass	Glass	3479	9 40
	W. H. Miller Co.	Valve	3480	5 40
	Schilling Foundry Co.	Castings	3481	1 59
	H. Cole Co.	Tracing cloth	3482	6 46
	H. Goldsmith	Music	3483	17 80
	Wm. Burdell, Jr.	Top dressing	3484	2 50
	Perry Smythe	Framing	3485	2 25
	Warren Southw'k C. Co.	Repairing	3486	55 00
	Columbus Buggy Co.	Hickory kindling	3487	2 00
8	B. S. Stephenson	Quartermaster service	3488	10 00
	J. W. Smith	Course lec'res met'r'l'gy	3489	100 00
	Columbus Gas Co.	May gas bill	3490	149 85
16	Bucher Eng. Co.	Blocking cuts	3491	30
11	Eldridge & Higgins Co.	Mason jars	3492	2 59
16	Columbus Gas Co.	Coke	3493	13 74
	Penna. Fuel Co.	Coal	3494	8 25
	Engelke & Bigelow	Hauling to dumps	3495	30 00
	Miller Furn. Co.	Leather couch	3496	35 00
	Col. Lithograph Co.	Bond engraving	3497	35 00
	F. E. Calkins	Work in law library	3498	2 40
	Orvis & Marshall	Office supplies	3499	2 00
	Western U. Tel. Co.	Telegrams	3500	6 46
	Postal Tel. & Cable Co.	"	3501	44
	Columbus Bank Note Co.	Diplomas	3502	98 00
	Hofman Supply Co.	Engraving	3503	1 86

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
June 16	Jones Nat. Fence Co...	Repairing fence.....	3508	$76 61
	Harrington & Non'm'ch'r	Cleaning nilometer	3504	1 50
	McAuley Sellars Co....	Curtains	3505	6 50
	Kinnear Gager Co.....	Steel ceiling	3506	80 00
	Col. Wire & Iron Wks..	Grills	3507	12 00
14	J. Ferrell	Granite bowl	3509	36 00
16	Seraphim B. Book Co..	Binding	3510	33 95
9	Alexis Cope	Salary, June, 1900.....	3511	187 50
16	McAllister Mohler Co..	Book case.....	3512	13 50
	F. J. Heer.....	Printing bulletins	3513	680 00
	Hall-Collins Hdw. Co..	Hardware	3514	3 33
	Borger Bros. & Co.....	Grate bars	3515	13 35
	Andrews & Knight.....	Lubricator	3516	3 08
	Wolfram Guitar Co....	Piano rent	3517	31 25
	Domestic Laundry	Towel washing	3518	23 92
	Beck & Orr.....	Mounting maps	3519	1 50
	Rich, Munk & Co.....	Supplies	3520	27 36
	W. H. Miller Co.....	Gate valves	3521	12 10
	W. W. Semple.....	Economizer	3522	10 50
	M. P. Streett.....	Balance on brick work..	3523	150 00
	E. Doddington & Co....	Lumber	3524	17 40
	Murray City Coal Co...	Coal	3525	978 80
	Schoedinger, F'rn & Co.	Glass	3526	2 52
	Kelton & Converse.....	Lumber	3527	36 77
	Standard Oil Co.....	Oil	3528	31 26
	Hann & Adair.....	Printing	3529	46 70
	R. A. McClure.....	Lumber and mill work..	3530	18 65
	McClelland & Co.....	Supplies	3531	2 40
	Dunn, Taft & Co.....	Dry goods	3532	14 83
	M. C. Lilley & Co.....	Flags, medals, etc.....	3533	123 75
	Engelke & Bigelow.....	Freight and cartage.....	3534	46 18
	Central Ohio Paper Co.	Paper	3535	22 03
	Capital City Mach. Wks.	Waste, shafting, etc....	3536	13 28
	Palmer & Beck.....	Boxes	3537	67 00
	Blackwood, Green & Co.	Tin, etc.....	3538	5 38
	Z. L. White Co.....	Velveteen	3539	1 88
	J. Penn	Drayage	3540	5 38
	Talmadge Hard. Co....	Hardware	3541	24 45
	Columbus Supply Co....	Supplies	3542	166 99
	Nitschke Bros	Printing	3543	370 05
	Champlin Printing Co..	Printing bulletins	3544	478 20
	Spahr & Glenn.....	" "	3545	21 75
	Osborne, Will's. & Horn	Coal	3546	54 70
	J. S. Abbott & Co.....	Hardware	3547	26 88
	Bradford, Rhodes & Co.	History of banking.....	3548	6 50
	J. Carbutt	Plates	3549	18 90
	G. E. Stechert.....	Books	3550	142 99
	Burrows Bros. Co.....	"	3551	49 52
	Open Court Pub. Co....	Portraits	3552	18 00
	H. W. Johns Mfg. Co...	Prime	3553	1 60
	Babcock & Wilcox Co..	Boiler installation	3554	53 97
	E. R. Curtiss.....	Set economists.....	3555	4 00
	Storrs & Harrison Co..	Roses	3556	7 21
	D. W. McGlenen.....	List high school names..	3557	10 00
	Egyptian Lacquer M. Co.	Lacquer	3558	1 38
	F. H. Smith.....	Leafillers	3559	3 50
	Crescent Steel Co.....	Steel	3560	25 61
	Lewis & Wiltsee.....	Advertising	3561	10 00
	Chicago Blue Pr. P. Co.	Blue print paper.....	3562	16 96
	American Aristotype Co.	Paper	3563	14 55
	J. S. Bushnell.....	Repairs	3564	3 90

STATEMENT II — Continued.

Date	To whom paid	For what purpose	No	Amount
1900				
June 16	Chicago Lab. S. & S. Co.	Supplies	3571	$3 60
	The Lunkenheimer Co..	Valves	3565	14 37
	Crosby St. G. & V. Co..	Pencil lever	3566	3 32
	Gardner Governor Co...	Pump governor	3567	27 00
	A. E. Foote	Mineral collection	3568	30 00
	E. H. Sargent	Clamps	3569	1 38
	Akron China Co	Bisque ware	3570	2 00
	Haussman & Dunn	Hauss speculum	3572	9 89
	J. C. Witter Co	Plaster casts	3573	15 74
	Storrs & Harrison Co...	Trees, stock, etc	3574	10 75
	M. J. Lampe	Charcoal	3575	9 00
	Webb Sta. & Ptg. Co...	Supplies	3576	11 70
	Am. Jersey Cattle Club.	Herd register	3577	10 00
	T. Meehan & Son	Shrubs	3578	20 40
	American Cotswold Co..	Record	3579	8 00
	Am. Clydesdale Assn...	Stud book	3580	12 00
	Colliery Engineer Co...	Sub. Mines & Minerals	3581	2 50
	W. H. Anderson & Co..	Digest Mich.	2582	18 00
	Lamson & Carpenter....	Linear perspective set...	3583	15 00
	H. B. Richards, Secy...	Herd book	3584	2 00
	Jos. Battell	Register	3585	5 00
	Geo. T. King	Cooking encyclopedia...	3586	18 50
	Library Bureau	Desk and chair	3587	35 00
	Knauth, Nachod Kuehne	Books	3588	8 97
	W. O. Thompson	Salary, June, 1900	3589	416 67
	C. E. Steeb	" "	3590	60 00
	E. D. Cickins	" "	3591	58 33
	E. R. Hubler	" "	3592	33 33
	K. H. Duncan	" "	3593	54 17
	W. C. McCracken	" "	3594	150 00
	C. M. Low	" "	3595	54 17
	W. A. Standley	" "	3596	50 00
	Ben. LeBay	" "	3597	50 00
	T. M. Boude	" "	3598	45 00
	Marion Peck	" "	3599	40 00
13	Geo. R. Rose	" "	3600	65 00
	J. Garrettson	" "	3601	37 39
	Ben. Irwin	" "	3602	45 00
	J. C. Ferry	" "	3603	12 50
	G. A. Goodspeed	" "	3604	40 00
	R. E. McIntosh	" "	3605	12 50
	D. D. Geren	" "	3606	40 00
	J. H. Brown	" "	3607	15 00
	J. H. Brown	" "	3608	25 00
	W. Whitestine	" "	3609	40 00
11	M. J. Kellenberger	Serv. in dom. economy.	3610	10 00
16	G. C. Denny	Salary, June, 1900	3611	40 00
14	E. G. Bailey	" "	3612	15 00
16	A. G. McCall	" "	3613	27 00
	M. N. Cook	" "	3614	40 00
	H. Chantler	" "	3615	40 00
	A. Chantler	" "	3616	45 00
	J. Kelly	" "	3617	25 00
	W. Townsel	" "	3618	25 00
	F. J. Tyler	" "	3619	25 00
	C. H. Woodruff	" "	3620	65 00
14	W. E. Mann	" "	3621	25 00
12	T. J. Godfrey	Expenses trustee	3622	32 50
14	J. G. Sterling, Treas..	Adv. in Makio	3623	50 00
	R. M. Rownd, P. M....	Postage deposit	3624	10 00
19	R. J. Seymour	33 hours' work com'ent	3633	4 95

STATEMENT II — Concluded.

Date	To whom paid	For what purpose	No	Amount
1900				
June 19	Dr. J. H. Barrows.....	Baccalaureate address...	3634	$50 00
16	J. McLain Smith.....	Expense trustee	3625	7 55
	J. T. Mack.....	Trustee expenses	3626	13 65
	F. R. Kunkle.....	Student labor	3627	16 95
	T. A. Panter.....	Janitor service	3628	18 00
	O. I. Dick.....	Student labor	3629	14 10
	H. A. Preston.....	Choir service	3630	25 00
19	R. M. Rownd, P. M....	500 2ct postage stamps..	3631	10 00
20	R. M. Downd, P. M....	2000 stamped envelopes.	3632	42 80
21	Central Union Tel. Co.	'Phone rent to June 30..	3635	81 00
22	D. M. Massie.....	Trustee expense.....	3636	32 37
25	C. W. Gayman.....	W. J. Bryan prize.....	3637	15 65
28	R. M. Rownd, P. M....	Postage stamps	3638	10 00
	Total.....	....	.....	$308,491 34

STATEMENT III.

In compliance with section 7 of the *Organic Act*, passed by the Legislature of Ohio, May 1, 1878, (Bates' Annotated Ohio Statutes, sec. 4105-41) which requires the list of "the number of professors, officers, teachers and other employes, and the compensation of each, to be annually reported," I submit the following:

Employes	Position	Salary
William Oxley Thompson	President	5,000 00
W. H. Scott	Professor of philosophy	2,250 00
(1) Edward Orton	" geology	600 00
W. R. Lazenby	" horticulture and forestry	2,250 00
Josiah R. Smith	" Greek language & literature	2,250 00
Henry A. Weber	" agricultural chemistry	2,250 00
Benj. F. Thomas	" physics	2,250 00
Geo. W. Knight	" history and political science	2,500 00
R. Daniel Bohannan	" mathematics	2,250 00
Herbert Osborn	" zoology and entomology	2,250 00
Ernst A. Eggers	" German langauge, literature	2,250 00
C. Newton Brown	" civil engineering	2,250 00
Albert M. Bleile	" anatomy and physiology	2,250 00
Wm. A. Kellerman	" botany	2,250 00
Thos. F. Hunt	" agriculture	2,250 00
Samuel C. Derby	" Latin language, literature	2,250 00
Nathaniel W. Lord	" metallurgy and mineralogy	2,000 00
Frank E. Sanborn	Director of industrial department	2,000 00
Allen C. Barrows	Professor of English literature	2,250 00
Joseph V. Denney	" rhetoric and Eng'sh lang'ge	2,250 00
Benj. L. Bowen	" Romance languages	2,250 00
W. F. Hunter	Dean of the faculty	2,500 00
Geo. B. Kauffman	Professor of pharmacy	2,000 00
J. P. Gordy	" education	2,250 00
Wm. T. Magruder	" mechanical engineering	2,250 00
Edward Orton, Jr.	Director school of ceramics	1,800 00
Frank A. Ray	Associate professor mining engineering	2,000 00
Jos. N. Bradford	Professor of drawing	1,800 00
Wm. McPherson	" " chemistry	2,250 00
Geo. W. McCoard	Associate professor mathematics	1,600 00
Sidney A. Norton	Lecturer in general chemistry	1,200 00
F. C. Caldwell	Associate professor electrical eng'eering	1,500 00
Henry C. Lord	Director observatory	1,600 00
C. E. Sherman	Assistant professor civil engineering	1,100 00
E. A. Hitchcock	Associate professor experim'al engineering	1,500 00
W. D. Gibbs	" " agriculture	1,600 00
C. W. Mesloh	" " German	1,100 00
David S. White	Professor veterinary medicine	1,600 00
Thos. E. French	Assistant in drawing	1,100 00
F. C. Clark	Associate professor of economics	1,600 00
Olive B. Jones	Librarian	1,350 00
William Henry Renck	Foreman carpenter shop	850 00
William A. Knight	" machine shops	1,000 00
Charles Philip Crowe	" forge room	800 00
J. E. Boyd	Assistant professor physics	1,200 00
Karl D. Swartzel	" mathematics	1,000 00
W. L. Graves	" rhetoric	1,000 00
Jas. S. Hine	Assistant professor of entomology	850 00
A. E. Vinson	" in agricultural chemistry	800 00
Charles B. Morrey	Assistant professor anatomy & physiology	1,000 00
John Wright Decker	Associate professor dairying	980 00
E. E. Somermeier	Assistant in metallurgy and mineralogy	700 00
Arthur W. Hodgman	Associate professor classic languages	1,100 00
Frank Ruhlen	Assistant in agriculture	720 00
J. A. Bownocker	Associate professor geology	1,000 00
W. H. Siebert	" European history	1,350 00

(1) Died October 16, 1899.

STATEMENT III — Continued.

Employes	Position	Salary
C. L. Arnold	Assistant professor of mathematics	1,000 00
Walter Landacre	" in pharmacy	700 00
W. F. Lavery	" veterinary medicine	700 00
E .E. Harold	Storekeeper	900 00
C. B .Frederick	Assistant professor veterinary medicine	700 00
Thos. K. Lewis	Assistant in drawing	600 00
Charles A .Bruce	Assistant professor of French	1,000 00
F. L. Landacre	Assistant in zoology	850 00
A. V. Bleininger	Assistant in ceramics	400 00
William E. Henderson	Assistant professor analytical chemistry	1,000 00
Harriet Townshend	Assistant in libary r	550 00
Frederick E. Kester	Instructor in physics	800 00
J. H. Schaffner	Assistant professor botany	1,000 00
Charles A. Grate	Fellow in mechanical engineering	300 00
F. T. Hale	" " "	300 00
F. A. Fish	Assistant in electrical engineering	600 00
Donald Alexis Kohr	Assistant in chemistry	600 00
Herbert Charles Gore	Fellow in chemistry	300 00
Maud Jeffreys	Assistant in library	550 00
Gertrude Kellicott	" "	550 00
G. B. Guittard	" "	550 00
Lucy Allen	" "	550 00
F. K. Luke	Florist	600 00
C. P. Linhart	Director physical training	1,600 00
Perla G. Bowman	Associate professor domestic science	1,400 00
Cornelia P. Souther	Assistant in domestic science	800 00
J. R. Taylor	Assistant professor Eng. literature	1,100 00
Francis M. Hamilton	" in philosophy and pedagogy	800 00
Stella Elliott Canfield	Associate director physical training	750 00
M. Dresbach	Fellow in anatomy and physiology	300 00
Emma L. Ball	" mathematics	300 00
John Wesley Young	" mathematics	300 00
A. H. McIntire	" industrial arts	300 00
Homer Charles Price	Assistant in horticulture and forestry	600 00
W. H. Page	Professor of law	1,400 00
E. B. Kinkead	"	1,200 00
D. F. Pugh	"	950 00
E. O. Randall	"	700 00
J. H. Collins	"	200 00
John A. Shauck	"	175 00
John B. Sanborn	Assistant in American history	700 00
Don C .Huddleson	" gymnasium	500 00
J. H. Vosskuehler	" drawing	300 00
Delbert A. Crowner	Student assistant in butter making	100 00
Elisha Smith	" " dairying	100 00
John B. Parker	Fellow in rhetoric	300 00
Herbert W. Kennedy	Emerson McMillin fellow in astronomy	300 00
Samuel W. Collett	Fellow in botany	250 00
Alexis Cope	Secretary	2,250 00
Carl E. Steeb	Accountant	720 00
Katharine H. Duncan	Executive clerk	650 00
Edith D. Cockins	Registrar	700 00
W. C. McCracken	Chief engineer	1,800 00
Chas. Low	Assistant engineer	650 00
Wm. Stanley	" "	600 00
Geo. R. Rose	Plumber	780 00
Benjamin Irwin	Watchman	540 00
James Kelley	Lawnkeeper	300 00
Mrs. E. R. Hubler	Telephone attendant	400 00
Benj. LeBay	Steam fitter	600 00

STATEMENT III — Concluded.

Employes	Position	Salary
Wash. Townsel	Janitor	300 00
G. A. Goodspeed	"	480 00
Henry Chantler	"	480 00
Arthur Chantler	"	540 00
J. H. Brown	"	480 00
M. N. Cook	"	480 00
D. D. Geren	"	480 00
Wm. Whitestine	"	480 00
G. C. Denny	"	480 00
E. H. Bailey	"	150 00
R. E. McIntosh	"	125 00
Wm. Weir	Elevator attendant	200 00
W. C. Mills	Curator of the archæological collection	350 00
A .G. McCall	Janitor	240 00
Thomas Boude	First fireman	450 00
W. E. Case	Second fireman	360 00
Marion Peck	Helper	400 00
Alice Dufour	Fellow in botany	250 00
F. O .Clements	" chemistry	300 00
J. E. Jeffrey	Laboratory assistant in chemistry	100 00
J. W. Groves	Assistant civil engineering	150 00
Wm. Cannan	Ceramic scholarship	200 00
Silas Martin	Assistant in drawing	500 00
W. E. Mann	McMillin fellowship in economics	250 00
Grace Pitts	Fellow in economics	300 00
J. P. Covan	Electrician	770 00
Chas. S. Prosser	Associate professor geology	1,500 00
E. H. Moore	Student assistant in German	200 00
J. W .Beach	Assistant in Latin	300 00
C. L. E. Moore	Student assistant in mathematics	150 00
A. F. Hall	Machinist	720 00
N. P. Oglesby	Assistant storekeeper	360 00
H. W. Brown	Fellow in physics	250 00
G. H. McKnight	Assistant professor of rhetoric	900 00
H. C. Allen	Asst. prof. rhetoric and public speaking	1,150 00
Chas. F. Dowd	Student assistant in French	200 00
O. V. Brumley	Assistant in veterinary medicine	500 00
Joseph Garrettson	Helper to plumber	450 00
J. C. Perry	Janitor	125 00
T. E. Osburn	"	320 00
W. Conklin	"	360 00
Earl Conway	Helper	240 00
C. H. Woodruff	Carpenter	780 00
F. J. Tyler	Gardener	75 00

COLUMBUS, OHIO, September 26, 1900.

To the Board of Trustees of the Ohio State University:

The finance committee, in obedience to your instructions, has examined the accounts and vouchers of L. F. Kiesewetter, treasurer of the university, for the fiscal year ending June 30, 1900, and has carefully compared them with the accounts and vouchers in the hands of the secretary, and hereby certifies that said report is correct.

D. M. MASSIE,
J. MCLAIN SMITH,
PAUL JONES,
Finance Committee.

REPORT OF RECEIPTS AND DISBURSEMENTS "NEW MORRILL FUND."

Report of treasurer of Ohio State University to the secretary of agriculture and the secretary of the interior, of amount received under act of congress of August 30, 1890, in aid of colleges of agriculture and the mechanic arts, and of the disbursements thereof, to and including June 30, 1900.

Balance on hand July 1, 1899	$37 31
Date of receipt of installment for 1899–1900, July 7, 1899. Amount	25,000 00
Total available for year ended June 30, 1900	25,037 31
Disbursements thereof for and during the year ended June 30, 1900:	
Agriculture, as per Schedule A	4,341 61
Mechanic Arts, as per Schedule B	8,178 19
English Language, as per Schedule C	1,258 99
Mathematical Science, as per Schedule D	2,072 82
Natural or Physical Science, as per Schedule E	7,860 40
Economic Science, as per Schedule F	1,126 99
Total expended during year	24,839 00
Balance remaining unexpended July 1, 1900	198 31

I hereby certify that the above account is correct and true, and, together with the schedules hereunto attached, truly represents the details of expenditures for the period and by the institution named, and that said expenditures were applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematical physical, natural, and economic science, with special reference to their application in the industries of life, and to the facilities for such instruction.

L. F. KIESEWETTER,
Treasurer.

SCHEDULE A.

Disbursements for instruction in Agriculture and for facilities for such instruction, during the year ended June 30, 1900.

Name of instructors	Subjects taught for which paid from "Morrill Fund"	Amount
I. For salaries of instructors:		
Thos. F. Hunt, Prof. of Agr....	Agriculture	$500
W. D. Gibbs, Asso. Professor..	"	320
Jno. W. Decker, Asso. Professor	Dairy Husbandry	140
Frank Ruhlen, Assistant.....	Agriculture	120
Perla G. Bowman, Asso. Prof...	Domestic Science	300
Cornelia Louther, Assistant....	Domestic Art	80
H. A. Weber, Professor.....	Agricultural Chemistry	450
A. E. Vinson, Assistant.....	" "	160
W. R. Lazenby, Professor.....	Horticulture	450
Homer C. Price, Assistant.....	"	50
David S. White, Professor.....	Veterinary Medicine	160
W. F. Lavery, Asst. Professor...	" "	70
C. B. Frederick, Assistant.....	" "	70
O. V. Brumley, Assistant.....	" "	50
J. A. Wallace, Lecturer.....	Agriculture	5
II. For facilities, as follows:		
Text-books and reference books.....		$69 28
Department of Agriculture.		
Seeds, $46.70; tools and hardware, $54.92; husking, $15.00; live stock, $32.00; harness, $86.27; feed, $322.20; farm implements, $9.00; machinery, $356.77; apparatus, $40.23; supplies, $5.71		$968 80
Dairy Laboratory.		
Dairy implements, $24.00; dairy supplies, $163.58; dairy machinery, $100.79; scales, $7.00.....		$295 37
Horticulture and Forestry.		
Pots, $20.00		$20 00
Veterinary Medicine.		
Jars, $13.58; hospital supplies, $16.22; instruments, $23.36; cages, $10.00		$63 16
Total		$4,341 61

SCHEDULE B.

Disbursements for instruction in Mechanic Arts and for facilities for such instruction, during the year ended June 30, 1900.

Name of instructors	Subjects taught for which paid from "Morrill Fund"	Amount
I. For salaries of instructors:		
C. N. Brown, Professor	Civil engineering	$450
C. E. Sherman, Asst. Professor	" "	220
John W. Groves, Assistant	" "	50
W. T. Magruder, Professor	Mechanical engineering	450
E. A. Hitchcock, Asso. Prof.	" "	300
C. A. Grate, Assistant	" "	30
F. J. Hale, Assistant	" "	30
N. W. Lord, Professor	Metallurgy and Mineralogy	400
F. A. Ray, Professor	Mine engineering	400
E. E. Somermeier, Assistant	Metallurgy	140
Edward Orton, Jr., Asso. Prof.	Ceramics	360
A. V. Bleininger, Assistant	"	90
F. C. Caldwell, Asso. Professor	Electrical engineering	320
F. A. Fish, Assistant	" "	120
J. P. Covan, Assistant	" "	70
Geo. B. Kauffman, Professor	Pharmacy	400
W. A. Landacre, Asst. Prof.	"	70
N. P. Oglesby, Assistant	"	40
F. E. Sanborn, Professor	Industrial Arts	380
W. A. Knight, Assistant	Machine work	100
W. H. Renck, Assistant	Carpenter and Pattern work	170
C. P. Crowe, Assistant	Forge work	160
A. H. McIntyre, Assistant	Industrial Arts	60
J. N. Bradford, Professor	Drawing	360
T. E. French, Asst. Professor	"	220
T. H. Lewis, Assistant	"	120
Silas Martin, Assistant	"	50
I. H. Vosskuehler, Assistant	"	30
II. For facilities, as follows:		
Text-books and reference books		$161 37
Department of Ceramics.		
Supplies, $25.22; hardware, $19.65; balances, $102.10; tile, $38.35; kiln, $351.99; pump, $4.61		541 92
Department of Civil Engineering.		
Tapes		5 36
Department of Drawing.		
Cameras, $230.75; drawing tables, $22.50		253 25
Department of Electrical Engineering.		
Castings, $81.28; electrical supplies, $98.90; lantern, $30.00; motor, $260.00; instruments, $46.85; tools and hardware, $27.41.		544 44

SCHEDULE B — Concluded.

	Amount.
Department of Industrial Arts.	
Lumber, $546.19; tools and hardware, $169.24; paints, $10.30; iron and steel, $64.74; supplies, $5.67; patterns, $32.60; machinery, $4.84	833 58
Department of Mechanical Engineering.	
Supplies, $14.90; machinery, $102.12; paints, $17.55; tools, $29.95; apparatus, $32.50; thermometers, $26.25; ice, $25.00	248 27
Total	$8,178 19

SCHEDULE C.

Disbursements for instruction in English Language and for facilities for such instruction, during the year ended June 30, 1900.

Name of instructors	Subjects taught for which paid from "Morrill Fund"	Amount
I. For salaries of instructors:		
A. C. Barrows, Professor	English Literature	$450
J. R. Taylor, Asst. Professor	" "	220
J. V. Denney, Professor	English and Rhetoric	225
H. C. Allen, Asst. Professor	" " "	115
W. L. Graves, Asst. Professor	" " "	100
Geo. H. McKnight, Assistant	" " "	90
J. B. Parker, Assistant	" " "	30
II. For facilities, as follows:		
Text-books and reference books		$28 99
Total		$1,258 99

SCHEDULE D.

Disbursements for instruction in Mathematical Science and for facilities for such instruction during the year ended June 30, 1900.

Name of instructors	Subjects taught for which paid from "Morrill Fund"	Amount
I. For salaries of instructors:		
R. D. Bohannan, Professor	Mathematics	$450
G. W. McCoard, Asst. Professor	"	320
C. L. Arnold, Asst. Professor	"	200
K. D. Swartzel, Asst. Professor	"	200
E. L. Ball, Fellow	"	60
J. W. Young, Assistant	"	60
H. C. Lord, Professor	Astronomy	320
II. For facilities, as follows:		
Text-books and reference books		$11 93
Department of Astronomy.		
Spectroscope, $200.00; electrical supplies, $11.89; electrical apparatus, $89.00; gas engine, $150.00		$450 89
Total		$2,472 82

SCHEDULE E.

Disbursements for instruction in Natural or Physical Science and for facilities for such instruction during the year ended June 30, 1900.

Name of instructors	Subjects taught for which paid from "Morrill Fund"	Amount
I. For salaries of instructors:		
A. M. Bleile, Professor	Anatomy and Physiology	$450
C. B. Morrey, Asst. Professor	" " "	200
M. Dresbach, Assistant	" " "	60
W. A. Kellerman, Professor	Botany	450
J. H. Schaffner, Assistant	"	210
S. W. Collett, Assistant	"	50
Alice Dufour, Assistant	"	25
W. McPherson, Professor	Chemistry	450
S. A. Norton, Lecturer	"	240
W. E. Henderson, Asst. Professor	"	200
D. A. Kohr, Assistant	"	120
F. O. Clements, Assistant	"	45
H. C. Gore, Assistant	"	30
Edward Orton, Professor	Geology	150
C. S. Prosser, Asso. Professor	"	300
J. A. Bownocker, Asso. Professor	"	200
B. F. Thomas, Professor	Physics	225
J. E. Boyd, Asst. Professor	"	120
F. E. Kester, Assistant	"	80
H. W. Brown, Assistant	"	25
H. Osborn, Professor	Zoology and Entomology	225
J. S. Hine, Asst. Professor	Entomology	85
F. L. Landacre, Asst. Professor	Zoology	85
II. For facilities, as follows:		
Text-books and reference books		$298 98
Department of Anatomy and Physiology.		
Model of brain, $10.00; supplies, $6.46; microscopes, $161.20		177 60
Department of Botany.		
Collections, $177.05; herbarium, $145.36; tools and hardware, $41.17; herbarium paper, $63.20; mica, $7.88; labels, $29.70; camera and plates, $181.90; pots, $17.10		664 26
Department of Chemistry.		
Apparatus, $488.17; chemicals, $124.31; balances, $52.75; chemical supplies, $969.13; platinum, $149.89; plates, $35.74; crucibles, $54.77		1,874 78
Department of Geology.		
Tree ferns, $10.95; specimen stone, $5.00		15 95
Department of Physics.		
Balances, $5.10; apparatus, $147.47; supplies, $31.80		184 37

SCHEDULE E — Concluded.

	Amount.
Department of Zoology and Entomology.	
Charts, $42.00; net, $9.50; bird skins, $58.30; mounting specimens, $177.25; specimens, $5.00; microscopes, $253.33; dissecting material, $15.95; drugs, $18.07; collections, $40.00.....	619 40
Total	$7,860 40

SCHEDULE F.

Disbursements for instruction in Economic Science and for facilities for such instruction, during the year ended June 30, 1900.

Name of instructors	Subjects taught for which paid from "Morrill Fund"	Amount
I. For salaries of instructors:		
Geo. W. Knight, Professor.....	History and Political Science..	$500
J. B. Sanborn, Assistant.....	" " " ..	140
F. C. Clark, Asso. Professor.....	Economics and Sociology....	320
Grace L. Pitts, Assistant.....	" " "	30
II. For facilities, as follows:		
Text-books and reference books.....		$136 99
Total		$1,126 99

University Bulletins Series 5, Number 2

OHIO STATE UNIVERSITY

THIRTIETH ANNUAL REPORT

OF THE

BOARD OF TRUSTEES

TO THE

GOVERNOR OF OHIO

FOR THE

Year Ending June 30, 1900.

PART II.

The State has no material resources at all comparable with its citizens, and no hope of perpetuity except in the intelligence and integrity of its people.

COLUMBUS
PUBLISHED BY THE UNIVERSITY
JUNE, 1900.

Entered at the Postoffice at Columbus, Ohio, as Second-Class Matter.

DAYS AND DATES

1900

Entrance Examinations (8 A. M.)	Monday,	September	17.
Registration Day	Tuesday,	September	18.
Lectures and Class-work begin (all Colleges)	Wednesday,	September	19.
Annual Address by the President (11 A. M.)	Friday,	September	21.
Meeting of Trustees	Wednesday,	September	26.
Thanksgiving Recess	Thursday,	November	29.
	Friday,	November	30.
Latest date for announcing Subjects of Theses	Saturday,	December	15.
First Term ends	Wednesday,	December	19.

Christmas Vacation.

1901

Second Term begins—Registration Day	Wednesday,	January	2.
First Semester (College of Arts, Philosophy and Science, and College of Law) ends	Friday,	February	8.
Second Semester (College of Arts, Philosophy and Science, and College of Law) begins—Registration Day	Monday,	February	11.
University Day	Friday,	February	22.
Second Term ends	Friday,	March	29.
Spring Recess—From 4 o'clock P. M.	Friday,	March	29.
to 8 o'clock A. M.	Wednesday,	April	3.
Third Term begins—Registration Day	Wednesday,	April	3.
Meeting of Trustees	Wednesday,	April	3.
High School Day	Friday,	May	17.
Field Day—Athletic Association	Saturday,	May	18.
Senior Vacation begins	Saturday,	May	25.
Competitive Drill—Cadet Battalion	Saturday,	May	25.
Memorial Day	Thursday,	May	30.
Final Examinations (all Colleges)	Monday, to Friday,	June	10. to 14.
Baccalaureate Sermon	Sunday,	June	16.
Entrance Examinations (8 A. M.)	Monday,	June	17.
	Tuesday,	June	18.
Class Day	Monday,	June	17.
Meeting of Trustees	Tuesday,	June	18.
Alumni Day	Tuesday,	June	18.
COMMENCEMENT	Wednesday,	June	19.

Summer Vacation.

Entrance Examinations (8 A. M.)	Monday,	September	16.
Registration Day	Tuesday,	September	17.
Lectures and Class-work begin (all Colleges)	Wednesday,	September	18.
Annual Address by the President (11 A. M.)	Friday,	September	20.
Meeting of Trustees	Wednesday,	September	25.

BOARD OF TRUSTEES

1899-1900

		Term Expires.
JOHN T. MACK	Sandusky	May 13, 1901.
LUCIUS B. WING	Newark	" 1902.
THOMAS J. GODFREY	Celina	" 1903.
J. McLAIN SMITH	Dayton	" 1904.
PAUL JONES	Columbus	" 1905.
OSCAR T. CORSON	Columbus	" 1906.
DAVID M. MASSIE	Chillicothe	" 1907.

OFFICERS OF THE BOARD

J. McLAIN SMITH	President.
OSCAR T. CORSON	Vice President.
ALEXIS COPE	Secretary.
LOUIS F. KIESEWETTER	Treasurer.

COMMITTEES OF THE BOARD

EXECUTIVE	FARM	FINANCE
L. B. WING	J. McLAIN SMITH	D. M. MASSIE
T. J. GODFREY	L. B. WING	J. McLAIN SMITH
PAUL JONES	JOHN T. MACK	PAUL JONES

FACULTY AND COURSES OF STUDY

THOMAS J. GODFREY OSCAR T. CORSON JOHN T. MACK

THE FACULTIES

Members of the Faculties, and Other Instructors

1899-1900

WILLIAM OXLEY THOMPSON.....University Grounds

President

A. B., Muskingum College, 1878; A. M., ibid., 1881; D. D., ibid., 1891; LL. D., Western University of Pennsylvania, 1897. Licensed by the Presbytery of Zanesville, Dresden, Ohio, April, 1881; Ordained by Presbytery of Fort Dodge, Iowa, July, 1882; Pastor Odebolt, Iowa, 1882–85; Pastor Longmont, Colorado, 1885–91; President Longmont College, 1885–89; President Miami University, 1891–99; present position since 1899.

*EDWARD ORTON.....100 Twentieth street

Professor of Geology, and State Geologist

A. B., Hamilton, 1848; Ph. D., Hamilton, 1875; LL. D., Ohio State University, 1881. Student of Theology, Lane Seminary, 1849; Student at Lawrence Scientific School, Harvard University, 1852; Student, Andover, 1854; Professor of Natural Science, State Normal School, Albany, N. Y., 1856–'59; Principal, Chester Academy, N. Y., 1859–'65; Professor of Natural History, Antioch, 1865–'72; President of Antioch, 1872–'73; President of the Ohio State University, 1873–'81; State Geologist, 1869; present position since 1881.

WILLIAM HENRY SCOTT.....131 Fifteenth avenue

Professor of Philosophy

A. B., Ohio University, 1862; M. A., Ohio University, 1865; LL. D., Ohio University and Ohio Wesleyan, 1884. Superintendent of Public Schools, Athens, Ohio, 1862–'64; Principal of the Preparatory Department of Ohio University, 1864–'65; Pastor of Main Street (now Trinity) M. E. Church, Chillicothe, Ohio, 1865–'67; Pastor of Town Street (now First) M. E. Church, Columbus, Ohio, 1867–'69; Professor of Greek, Ohio University, 1869–'72; President and Professor of Philosophy, Ohio University, 1872–'83; President and Professor of Philosophy, Ohio State University, 1883–'95; present position since 1895.

SIDNEY AUGUSTUS NORTON.....363 East Town street

Emeritus Professor of Chemistry

A. B., Union, 1856; A .M., Union, 1859; M. D., Miami Medical College, 1867; Ph. D., Kenyon, 1878; LL. D., Wooster, 1881. LL. D., Union, 1899. Student at Bonn, Leipsic, Heidelberg; Teacher, Poughkeepsie Collegiate Academy, 1856; Tutor, Union, 1857; Principal Hamilton (Ohio) High School, 1858; Instructor of Natural Science, Cleveland High Schools, 1859–'66; Teacher of Natural Science, Mt. Auburn, 1866–'72; Professor of Chemistry, Miami, 1867–'72; Acting Professor of Physics, Union, 1872–'73; Professor of Chemistry, Ohio State University, 1873–'95; Lecturer in Chemistry, 1895–'99; Present position since 1899.

STILLMAN W. ROBINSON.....1353 Highland street

Emeritus Professor of Mechanical Engineering

C. E., University of Michigan, 1863; D. Sc., Ohio State University, 1896; Assistant Engineer U. S. Lake Survey, 1863–'66; Instructor in Engineering, University of Michigan, 1866–'67; Assistant Professor Mining Engineering and Geology, University of Michigan, 1867–70; Professor Mechanical Engineering and Physics, University of Illinois, 1870–'78; Professor Mechanical Engineering and Physics, Ohio State University, 1878–'81; Professor Mechanical Engineering, Ohio State University, 1881–'95. Resigned in 1895. Consulting Mechanical Engineer and Inventor for Wire Grip and McKay Shoe Machinery Companies, 1884–'98; Re-elected Emeritus Professor of Mechanical Engineering, Ohio State University, 1899. State Inspector of Railroads and Bridges, 1880–84. Consulting Engineer Santa Fe R. R., 1887–'90, Consulting Engineer Lick Telescope and Mountings, 1887.

*Died, October 16, 1899.

NATHANIEL WRIGHT LORD.....338 West Eighth avenue

Professor of Mineralogy and Metallurgy, Director of the School of Mines, and Dean of the College of Engineering

E. M., Columbia, 1876; Assistant Engineer, Cincinnati, 1877; Engineer and Metallurgist Monte Grande Gold Mining Co, Nicaragua, 1878; Assistant School of Mines, O. S. U., 1879; Chemist Ohio Geological Survey, 1880–'88; Assistant Professor of Mining and Metallurgy, O. S. U., 1880–'87; Professor Mining and Metallurgy, O. S. U., 1887–'91; Professor Metallurgy and Mineralogy, O. S. U., 1896; Chemist State Board of Agriculture, 1881–'99; Chemist State Board of Health, 1896–'98; present position since 1896.

SAMUEL CARROLL DERBY.....93 Fifteenth avenue

Professor of Latin

A. B., Harvard, 1866; A. M., Harvard, 1869 (in course), 1877 (by examination). Principal of Schools, Ilion, N. Y., 1866–'67; Assistant in Dixwell's Classical School, Boston, 1867–'70; Professor of Language, Antioch, 1870–'81; President, Antioch, 1877–'81; Student, Latin and History, Harvard, 1876–'77; Student, Latin and History, Johns Hopkins, 1880–'81; Student, Latin, Harvard, 1892–'93; present position since 1881.

WILLIAM RANE LAZENBY.....348 West Eighth avenue

Professor of Horticulture and Forestry

B. Agr., Cornell, 1874; M. Agr., Iowa Agricultural College, 1887. Instructor Horticulture and Botany, Cornell, 1874–'77; Assistant Professor of Horticulture, Cornell, 1877–'81; Lecturer, N. Y. State Grange, 1874–'81; Director Ohio U. S. Experiment Station, 1882–'87; Professor of Botany and Horticulture, Ohio State University, 1881–'92; present position since 1892.

JOSIAH RENICK SMITH.....950 Madison avenue

Professor of the Greek Language and Literature

A. B., Amherst, 1871; A. M., Amherst, 1883; Principal, Mound Street School, Columbus, 1871–'73; Teacher, Columbus High School, 1873–'76; Assistant Professor of Ancient Languages, Ohio State University, 1876–'81; Student at Leipsic, 1881–'83; present position since 1883.

HENRY ADAM WEBER.....1342 Forsythe avenue

Professor of Agricultural Chemistry

Graduate of Polytechnic School, Kaiserslautern, 1866; Student, Chemistry under Von Liebig and Reischauer, and of Mineralogy under Von Kobell, Munich, 1866–'68; Ph. D., Ohio State University, 1879; Ohio Geological Survey, Chemical Department, 1869–'74; Professor of General Chemistry and Mineralogy, Illinois State University, 1874–'82; Chemist to State Board of Agriculture, Illinois, 1874–'82; Chemist to State Board of Health, Illinois, 1874–'82; State Chemist and Chief Chemist to Ohio State Dairy and Food Commissioner, 1885–'97; present position since 1884.

BENJAMIN FRANKLIN THOMAS.....University Grounds

Professor of Physics, and State Sealer of Weights and Measures

B. Sc., Ripon, 1874; M. Sc. Ripon, 1877; Ph. D., Stevens Institute, 1880. Instructor in Mathematics and Physics, Carleton College, Northfield, Minnesota, 1876–'79; Professor of Physics, University of Missouri, 1880–'85; Member of the Board of Examiners at the International Electrical Exhibition at Philadelphia, 1884; Member of the Jury of Awards, Department of Electricity, at the World's Columbian Exposition, Chicago, 1893; present position since 1885.

GEORGE WELLS KNIGHT.....University Grounds

Professor of American History and Political Science and of Constitutional Law

A. B ,.University of Michigan, 1878; A. M., University of Michigan, 1883; Ph. D., University of Michigan, 1884; Student, Law, University of Michigan, 1878–'79; Principal of High School, Lansing, Michigan, 1879–'81; Student, History and Political Science, University of Michigan, 1882–'84; Instructor in History, Ann Arbor High School, 1883–'85; Professor of History and English Literature, Ohio State University, 1885–'87; Professor of History and Political Science, Ohio State University, 1887–'98; Student at Universities of Halle, Berlin, and Freiburg, 1889–'90; present position since 1898.

ROSSER DANIEL BOHANNAN.....Sixteenth and Indianola avenues

Professor of Mathematics

B. Sc., C. E., E. M., University of Virginia, 1876; Student of Mathematics and Physics, Cambridge, England, 1880–'82; Göttingen, 1882–'83; Teacher of Mathematics and Latin, Suffolk Collegiate Institute, Virginia, 1876–'77; Teacher of Mathematics and English, New York Latin School, New York City, 1877–'78; Professor of Mathematics and Natural Science, Emory and Henry College, 1878–'80; Acting Professor of Mathematics, University of Virginia, 1883–'84; Assistant in Mathematics and Physics, University of Virginia, 1884–'87; Professor of Mathematics and Astronomy, Ohio State University, 1887–'95; present position since 1895.

C. NEWTON BROWN.....1343 Forsythe avenue

Professor of Civil Engineering

C. E., Miami, 1886; Resident Engineer of the Ironton Extension of the Pittsburg, Cincinnati, Chicago & St. Louis R. R., 1881; Ohio Geological Survey, 1882; Assistant in Mathematics and Civil Engineering, Ohio State University, 1883–'85; Associate Professor of Civil Engineering, Ohio State University, 1885–'90; present position since 1890.

ERNST AUGUST EGGERS.....190 West Eleventh avenue, University Grounds

Professor of Germanic Languages and Literatures

Student in Gymnasium at Hanover, at Michigan State Normal School, the Sorbonne, College de France; Instructor in German in the High Schools of Michigan for ten years; Assistant in German, Ohio State University, 1886–'88; Assistant Professor of German, same institution, 1888–'90; present position since 1890.

ALBERT MARTIN BLEILE.....218 King avenue

Professor of Anatomy and Physiology

M. D., Starling Medical College, 1876; Student, Vienna, Chemistry and Physiology, 1876–'77; Student, Physiology, Leipsic, 1877–'78; Student Anatomy and Histology, Paris, 1878–'79; Lecturer on Experimental Physiology, Starling Medical College, 1879; Professor of Physiology, Starling Medical College, 1884; present position since 1891.

WILLIAM ASHBROOK KELLERMAN.....175 Eleventh avenue

Professor of Botany

B. Sc., Cornell, 1874; Ph. D., Zurich, 1881; Professor of Natural Science, Wisconsin State Normal School, 1874–'79; Professor of Botany and Horticulture, Kentucky State College, 1881–'82; Professor of Botany and Zoology, Kansas State Agricultural College, 1883–'87; Professor of Botany, Kansas State Agricultural College, 1888–'91; Botanist, Kansas State Board of Agriculture, 1883–'91; Ohio Geological Survey (Botany) 1892–'93; Founder and Editor of the Journal of Mycology, 1885–'89; present position since 1891.

THOMAS FORSYTH HUNT.....188 West Tenth avenue

Professor of Agriculture, and Dean of the College of Agriculture and Domestic Science

B. Sc., University of Illinois, 1884; M. Sc., University of Illinois, 1892; Assistant to Illinois State Entomologist, 1885–'86; Assistant in Agriculture, University of Illinois, 1886–'88; Assistant Agriculturalist, Illinois Experiment Station, 1888–'91; Professor of Agriculture, Pennsylvania State College, 1891–'92; present position since 1892.

GEORGE BEECHER KAUFFMAN.....University Grounds

Professor of Pharmacy, and Dean of the College of Pharmacy

B. Sc., Ohio Wesleyan University, 1877; Pharm. D., Scio, 1894; Associate Professor of Pharmacy, Ohio State University, to 1894; present position since 1894

BENJAMIN LESTER BOWMAN.....775 East Broad street

Professor of Romance Languages and Literature

A. B., University of Rochester, 1881; Ph. D., Johns Hopkins University, 1888. Postgraduate work, University of Rochester, 1881–'82; Professor of Languages, New Windsor College, Maryland, 1882–'83; Graduate Student and Assistant in French, Johns Hopkins University, 1883–'86, and 1887–'88; Student at the University of Paris, Bonn, Rome and Madrid, 1885, and 1886–'87; Professor of French and Latin, Bowdoin College, 1888–'89; Acting Associate Professor of French Language and Literature, Ohio State University, 1889–'90; Associate Professor of Romance Languages and Literatures, Ohio State University, 1890–'94; present position since 1894.

JOSEPH VILLIERS DENNEY.....230 West Tenth avenue

Professor of Rhetoric and the English Language, and Secretary of the University Faculty

A. B., University of Michigan, 1885. Journalist, 1885–'88; Principal of the Aurora (Illinois) High School, 1888–'90; Instructor in English and Graduate Student, University of Michigan, 1890–'91; Associate Professor of Rhetoric, Ohio State University, 1891–'94; present position since 1894.

ALLEN CAMPBELL BARROWS.....85 West Tenth avenue

Professor of English Literature, and Dean of the College of Arts, Philosophy and Science

A. B., Western Reserve, 1861; A. M., Western Reserve, 1866; D. D., Iowa College, 1889. Teacher, Latin and Greek, Phillips Academy, 1865–'66; Professor of Physics, Western Reserve, 1866–'70; Professor of Latin and English Literature, Western Reserve, 1870–'71; Professor of English Literature and History, Iowa Agricultural College, 1887–'94; present position since 1894.

EDWARD ORTON, Jr.....The Normandie

Director of the Department of Clay-Working and Ceramics

E. M., Ohio State University, 1884. Assistant on Ohio Geological Survey, 1882; Chemist for Columbus and Hocking Coal and Iron Company, 1885–'86; Superintendent of Blast Furnace at New Straitsville, O., 1887–'88; Superintendent of Victoria Furnace, Goshen Bridge, Va., 1888; Steel Worker, Homestead Steel Works, Homestead, Pa., 1889; Superintendent Ohio Paving Company's Factory, Columbus, Ohio, 1890–'92; Special Assistant on Clays, Ohio Geological Survey, 1892; Superintendent Acme Vitrified Brick Co., Louisville, Kentucky, 1893; State Geologist of Ohio, 1899; present position since May, 1894.

WILLIAM FORREST HUNTER.....1032 Bryden Road; 18 Board of Trade

Dean of the College of Law, Professor of the Law of Sales, Bailments, Evidence, Mortgages, Suretyship, Construction of Contracts, Law of Corporations, Judge of Moot Courts

Admitted to the Bar in 1861; Student, University of Michigan Law School; practicing attorney since 1866; Dean of the Law School, Ohio State University, 1892–'96; present position since 1896.

DAVID FRANKLIN PUGH.....1320 Highland street; Board of Trade

Professor of Equity Jurisprudence, Law of Real Property and Municipal Corporations

Member of West Virginia Constitutional Convention, 1872; Member of Legislature, West Virginia, 1874–'75; Prosecuting Attorney, Tyler County, West Virginia, 1870–'80; Common Pleas Judge, Franklin County, Ohio, 1887–'99; present position since 1891.

EMILIUS OVIATT RANDALL.....1025 Oak street; Supreme Court Room

Professor of Agency, Commercial Law and Partnership

Ph. B., Cornell, 1874; LL. B., LL. M., Ohio State University, 1892. Admitted to practice, 1890; Secretary Ohio State Historical Society; Reporter Supreme Court of Ohio. Present position since 1893.

EDGAR BENTON KINKEAD.....Wyandotte avenue; Board of Trade

Professor of Pleading and Probate Practice, Torts, Criminal Law, Ethics, Trial Practice and Law of Contracts (Engineers)

Assistant State Law Librarian, 1887–1894; Special Counsel for Attorney-General of Ohio, 1897–1900. Present position since 1895.

WILLIAM HERBERT PAGE.....1068 Franklin avenue; 27 Board of Trade

Professor of Elementary Law, Contracts and Wills

B. A., Yale, 1889; LL. B., Ohio State University, 1892; LL. M., same institution, 1894. Instructor in Central High School, Columbus, Ohio, 1889–'96. Present position since September, 1896.

WILLIAM THOMAS MAGRUDER.....191 King avenue

Professor of Mechanical Engineering

M. E., Stevens Institute of Technology, 1881. Practical Experience in Machine Design and Shop Practice, Taunton, Mass., 1881–'86. Student in Chemistry and Mathematics, etc., Johns Hopkins University, 1886–'87; Professor of Mechanical Engineering (practical and theoretical) Vanderbilt University, 1887–'96; present position since September, 1896.

J. P. GORDY.....The Normandie
Professor of Education

Ph. D., University of Leipsic, 1884; LL. D., Western University of Pennsylvania, 1897. Student in Philosophy at Leipsic, 1883–'84; Student in Philosophy at Johns Hopkins University, 1886; Assistant in Revision of Webster's Dictionary, 1884–'85; Professor of Philosophy and Pedagogy, Ohio University, Athens, 1886–'96; present position since September, 1896.

WILLIAM McPHERSON.....97 Hamilton avenue
Professor of Chemistry

B. Sc., Ohio State University, 1887; M. Sc., Ohio State University, 1890; D. Sc., Ohio State University, 1895; Ph. D., University of Chicago, 1899; Instructor in Chemistry and Physics, Toledo High School, 1887–'89; Instructor in Chemistry and Latin, Toledo High School and Manual Training School, 1889–'92; Assistant in Chemistry, Ohio State University, 1892–'93; Assistant Professor in Chemistry, Ohio State University, 1893–'95; Associate Professor, General Chemistry, Ohio State University, 1895–'97; present position since 1897.

JOSEPH NELSON BRADFORD.....54 West Tenth avenue
Professor of Drawing

M. E., Ohio State University, 1883. Draftsman, Ohio Geological Survey, 1882; Machinist and Draftsman, Pittsburg, Cincinnati & St. Louis Railroad, 1883–85; Assistant in Mechanical Engineering and Drawing, Ohio State University, 1885–'90; Assistant Professor of Drawing, Ohio State University, 1890–'93; Associate Professor of Drawing, Ohio State University, 1893–'99. Present position since 1899.

DAVID STUART WHITE.....West Fifth avenue
Professor of Veterinary Medicine, and Dean of the College of Veterinary Medicine

D. V. S., Ohio State University, 1890. Student, Royal Veterinary Schools of Hanover, Berlin, 1890–'91; at Imperial Veterinary Institute of Vienna, 1892; Royal Veterinary College of Dresden, 1893; Assistant in Veterinary Medicine, Ohio State University, 1893–'95. Present Position since 1895.

HERBERT OSBORN.....485 King avenue
Professor of Zoology and Entomology

B. Sc., Iowa Agricultural College, 1879. M. Sc., same institution, 1880. Student of Entomology at Museum Comparative Zoology (Cambridge, Mass.) 1881–'82; College of Physicians and Surgeons, Des Moines, 1884–85 (Anatomy and Physiology); Zoological Station Naples (Smithsonian table), 1894–'95. Assistant in Zoology and Entomology, Iowa Agricultural College, 1880–'83; Assistant Professor of Zoology and Entomology, Iowa Agricultural College, 1884–'85. Professor of Zoology and Entomology, Iowa Agricultural College, 1886–'98; Special Agent Division of Entomology, U. S. Department of Agriculture, 1885–'94; Entomologist, Iowa Experiment Station, 1890–'98; State Entomologist, Iowa, 1898. Present position since 1898.

FRANK EDWIN SANBORN.....380 West Eighth avenue
Director of the Department of Industrial Arts

S. B., in Mechanical Engineering, Massachusetts Institute of Technology, 1889. Assistant in Drawing, Massachusetts Institute of Technology, 1889–'90; Teacher in Manual High School Department, Pratt Institute, 1890–'91; Walker Special Instructor, Tufts College, 1891–'94; Instructor in Mechanical Department, Tufts College, 1894–'98. Present position since September, 1898.

HENRY CURWEN LORD.....401 West Sixth avenue
Director of the Emerson McMillen Observatory, and Associate Professor of Astronomy

B. Sc., University of Wisconsin, 1889. Assistant in Washburn Observatory, University of Wisconsin; with Thompson-Houston Electric Company, 1889; Assistant in Mathematics and Astronomy, Ohio State University, 1891–'94; elected Fellow, Royal Astronomical Society, 1897; Present position since 1895.

CHRISTOPHER P. LINHART.....Gymnasium; The Vendome
Director of the Gymnasium, and Instructor in Physical Education

M. D., Western Reserve University, Cleveland, 1882. Post-graduate student, same institution, 1882–'83. Student and Instructor, Dr. Anderson's Normal School of Physical Education, 1886; student in Harvard Summer School, 1887; House Physician and Surgeon, Cleveland City Hospital, 1883–'85; Assistant Demonstrator of Anatomy, Western Reserve University, 1885–'86, and Assistant Visiting Physician Charity Hospital, Cleveland, 1886; Director of Y. M. C. A. Gymnasium, Orange, N. J., 1886 and 1888; Instructor in Physiology and Physical Education, Newark, (N. J.), Academy, 1887 and 1890, and Director of Physical Education, Newark, N. J., Public Schools, 1888–'90; Medical Director Manhattan Athletic Club, 1891 and 1892; Instructor in Physiology and Physical Education, Union College, 1892–'97. Present position since 1897.

JAMES MADISON BURNS.....The Columbus Club
Professor of Military Science and Tactics

Graduate of the Beaver Academy, Pennsylvania. Entered the volunteer service 1861; discharged July 17th, 1865. Appointed second lieutenant 17 infantry U. S. A.; promoted to first lieutenant and captain same regiment; served thirty-one years in that organization, the greater portion of the time on the extreme frontier. Promoted to major and retired on account of disability incurred in the line of duty, May 22, 1899. Appointed to present position October 1st, 1899.

FRANK ARNOLD RAY.....137 King avenue
Associate Professor of Mine Engineering

E. M., Ohio State University, 1887. Superintendent building construction, Elah Terral & Co., 1887–'88; Assistant Mining Engineer C. & H. C. & I. Co, 1888–'89; Chief Engineer C. & H. C. & I. Co, 1889–92; Chief Engineer Congo Coal Mining Co., 1892–'95; Assistant Professor of Mine Engineering, O. S. U., 1895–'97; present position since 1897.

FRANCIS CARY CALDWELL.....55 Cleveland avenue
Associate Professor of Electrical Engineering

A. B., Cornell, 1890; M. E. Cornell, 1891. With Thompson-Huston Electric Co., Lynn Mass., 1891–'92; Student at the National Polytechnic, Zurich, 1892–'93; Assistant Professor of Electrical Engineering, Ohio State University, 1893–'97. Present position since 1897.

PERLA G. BOWMAN.....The Dennison
Associate Professor of Domestic Science; in charge of the Department of Domestic Economy

Graduate of Toledo High School; Graduate of Toledo Manual Training School; Student at Wells College; Instructor in Toledo Manual Training School; Director of Domestic Science, Toledo Manual Training School; Special Student at Pratt Institute (Brooklyn), and the University of Michigan. Present position since September, 1897.

FREDERICK CONVERSE CLARK.....1634 Neil avenue
Associate Professor of Economics and Sociology

A. B., University of Michigan, 1887; A. M., University of Michigan, 1888; Ph. D., University of Michigan, 1891. Student at Halle and Berlin, 1893–'95; Instructor in History and Economics, Ann Arbor High School, 1888–'92; Assistant Professor of Political Economy, Stanford University, 1892–'93; Assistant Professor of Economics and Sociology, Ohio State University, 1895–'98. Present position since 1898.

WILBUR HENRY SIEBERT.....1332 Highland street
Associate Professor of European History

A. B., Ohio State University, 1888; A. B., (with honorable mention) Harvard University, 1889; M. A., Harvard, 1890. Student, Freiburg and Berlin, 1890–'91; Student, Harvard, 1895; Assistant in History and Political Science, Ohio State University, 1891–'93; Assistant Professor of History, Ohio State University, 1893–'95, 1897–'98; Student, Harvard University, 1895–'97. Present position since 1898.

OLIVE B. JONES.....53 Eleventh avenue
Librarian

Assistant Librarian, 1887. Present position since 1893.

EMBURY ASBURY HITCHCOCK.....380 West Eighth avenue
Associate Professor of Experimental Engineering

M. E., Cornell, 1890. Straightline Engine Company, Syracuse, N. Y., 1889; Corliss Steam Engine Company, Providence, R. I., 1890–'93; Assistant in Mechanical Engineering, Ohio State Univerversity, 1893–'95; Assistant Professor of Mechanical Engineering in charge of the Department, 1895–'96; Assistant Professor, Experimental Engineering, Ohio State University, 1896–'97. Present position since 1897.

WILLIAM DAVID GIBBS.....The Dennison
Associate Professor of Agriculture

B. Sc., University of Illinois, 1893. Fellowship in Agriculture, University of Illinois, 1893–'94; Post-graduate work, University of Illinois and University of Wisconsin, 1895; Expert Assistant in Division of Agricultural Soils of the United States Department of Agriculture, summer of 1895; Teacher of Bacteriology, University of Illinois, fall term, 1893; Assistant in Animal Husbandry, University of Illinois, winter term, 1894; Assistant in Agriculture, Ohio State University, spring and fall terms, 1895; Assistant Professor of Agriculture, 1895–'98. Present position since 1898.

STELLA ELLIOTT CANFIELD.....1457 Worthington street
Associate Director of the Gymnasium

Student, University of Nebraska, three years; Chautauqua School of Physical Education, summer of 1897; Assistant in Physical Training, University of Nebraska, two years; Y. M. C. A. classes in Physical Training, Lincoln, Nebraska, one year, and in Aurora, Illinois, one year; Medical Gymnastic Course, Chautauqua School of Physical Education, Summer, 1899; Assistant Director of Gymnasium, 1897–'98. Present position since 1898.

GEORGE WASHINGTON McCOARD.....325 West Sixth avenue
Associate Professor of Mathematics

B. A., Bethany, West Virginia, 1873; M. A., Bethany, 1882. Principal of Oakdale Classical Normal Institute, Allegheny County, Pennsylvania, 1873–'74; Private Tutor in Cleveland, Ohio, 1874–'80; Principal of Public Schools, Irving Park, Chicago, 1880–'81; Teacher of Latin and Mathematics, Columbus High School, 1881–'82; Assistant in Mathematics and Latin, Ohio State University, 1882–'87. Assistant Professor of Mathematics, Ohio State University, 1887–'99. Present position since 1899.

CHARLES WALTER MESLOH.....University Grounds
Associate Professor of Germanic Languages and Literatures

A. B., Ohio State University, 1889; M. A., Ohio State University, 1895. Student in the University of Chicago, 1894; Student, University of Berlin, 1896–'97; Assistant in German, Ohio State University, 1889–'95. Present position since 1895.

ARTHUR WINFRED HODGMAN.....164 West Ninth avenue
Associate Professor of the Classic Languages

A. B., Harvard, 1890; A. M., Harvard, 1893; Ph. D. (Classical Philology) Harvard, 1896. Student in Graduate School, Harvard, Classical Philology, 1892–'96. Instructor in Preparatory Schools, Quincy, Duxbury, Mass., 1890–'92; Assistant in Greek and Latin, Ohio State University, 1896–'97. Assistant Professor of the Classic Languages, Ohio State University, 1897–'99. Present position since September, 1899.

CHARLES SMITH PROSSER.....1362 Highland street
Associate Professor of Historical Geology

B. S., Cornell University, 1883; M. S., Cornell University, 1886. Fellow in Natural History, Cornell, 1884–'85; Instructor in Paleontology, Cornell University, 1885–'88; Assistant Paleontologist, U. S. Geological Survey, 1888–'92; Professor of Natural History, Washburn College, Topeka, Kansas, 1892–'94; Assistant Geologist, U. S. Geological Survey, 1893–'94; Professor of Geology, Union College, Schnectady, N. Y., 1894–'99. Assistant Geologist, N. Y. Geological Survey, 1895–'99; Assistant Geologist, University Geological Survey of Kansas, 1896; Chief of Appalachian Division, Maryland Geological Survey since 1898. Present position since 1899.

JOHN ADAMS BOWNOCKER.....1594 Neil avenue
Associate Professor of Inorganic Geology

B. Sc., Ohio State University, 1889; D. Sc., Ohio State University, 1897. Principal of High School, Martins Ferry, 1889–'92; Fellow in Geology, University of Chicago, 1892–'94; Graduate Scholar, Yale University, 1894–'95; Assistant Geological Survey of Ohio, 1892; Assistant Geological Survey of New Jersey, 1893; Assistant in Geology, 1895–'98. Assistant Professor 1898–'99. Present position since 1899.

JOHN WRIGHT DECKER.....329 West Eighth avenue
Associate Professor of Dairying

B. Agr., University of Wisconsin, 1890. Fellow in Agriculture, University of Wisconsin, 1890–'91. Instructor in Dairying University of Wisconsin, 1891–99. Present position since 1899.

JAMES ELLSWORTH BOYD.....25 Maynard avenue
Assistant Professor of Physics

B. Sc., Ohio State University, 1891; M. Sc., Cornell, 1896. Student in Physics and Mathematics, Ohio State University, 1893–'95; Student in Experimental and Theoretical Physics, Cornell, 1895–'96; also Student in Sibley College of Mechanic Arts, Cornell, summer of 1895. Assistant in Physics, Ohio State University, 1891–'95; held scholarship in Physics, Cornell, 1895. Present position since September, 1896.

JOSEPH RUSSELL TAYLOR.....The Dennison
Assistant Professor of English Literature

B. A., Ohio State University, 1887; M. A., Columbia University, 1897. Assistant in Drawing, Ohio State University, 1889–'94; Assistant in Rhetoric, Ohio State University, 1894–'97; University Fellow in Literature, Columbia University, 1896–'97; Assistant Professor of Rhetoric, Ohio State University, 1897–'99; present position since 1899.

CHRISTOPHER ELIAS SHERMAN.....772 Oak street
Assistant Professor of Civil Engineering

C. E., Ohio State University, 1894. Engaged in Civil Engineering in Ohio, Tennessee, Virginia, North Carolina and Arizona for three years during college course. Engaged in railroad, geological and governmental engineering from graduation until September, 1896. Engineer to Park Commission, Springfield, Ohio, and U. S. Assistant Engineer at Tampa, Florida, and Huntsville, Alabama, summer of 1898. U. S. Assistant Engineer on road surveys of Yellowstone National Park, summer of 1899. Assistant in Civil Engineering, Ohio State University, 1896–'97. Present position since 1897.

WILLIAM LUCIUS GRAVES.....1313 Forsythe avenue
Assistant Professor of Rhetoric

B. A., Ohio State University, 1893; M. A., Ohio State University, 1897. Principal High School, Coshocton, 1894–'95; Fellow and Assistant in Rhetoric and English Language, Ohio State University, 1895–'96. Present position since 1896.

*CLAIR ALBERT DYE.....169 King avenue
Assistant Professor of Pharmacy

G. Ph., Ohio State University, 1891. Post-graduate student in Chemistry and Pharmacy, Ohio State University; Assistant in Chemistry and Pharmacy, 1890–'94; Assistant in Pharmacy, 1894–'98. Present position since 1898.

THOMAS EWING FRENCH.....1458 Worthington street
Assistant Professor of Drawing

M. E., Ohio State University, 1895. Assistant in Drawing Department three years preceding graduation; Draftsman, The Smith-Vaile Company, Dayton, 1888–'90; Instructor in Mechanical Drawing, Y. M. C. A., Dayton, 1888–'91; Chief Draftsman, The Smith-Vaile Company, Dayton, 1891; Assistant in Drawing, 1892–'98. Present position since 1898.

*CHARLES WILLIAM FOULK.....Leipzig, Germany
Assistant Professor of Analytical Chemistry

B. A., Ohio State University, 1894. Assistant in General Chemistry, 1896–'98. Present position since September, 1898.

* In Europe on leave of absence.

CHARLES LINCOLN ARNOLD.....328 West Eighth avenue

Assistant Professor of Mathematics

B. Sc., Ohio State University, 1890; M. Sc., Ohio State University, 1894. Post-graduate Student, University of Chicago and Ohio State University, 1894–'95. Assistant in Methematics Ohio State University, 1890–'99. Present position since 1899.

KARL DALE SWARTZEL.....57 East Eighth avenue

Assistant Professor of Mathematics

B. Sc., Ohio State University, 1893; M. Sc., Ohio State University, 1894. Fellow and Assistant in Mathematics, Ohio State University, 1894–'95. Assistant in Mathematics, Ohio State University, 1895–'99. Present position since 1899.

CHARLES A. BRUCE.....234 West Tenth avenue

Assistant Professor of the Romance Languages

A. B., Ohio State University, 1895; Student of French, Amherst, Summer School, 1895; Graduate Student, University of Chicago, Summer Quarter, 1896; Student, University of Geneva, Summer School, 1898; Student at the Sorbonne, College de France, and Ecole des Hautes-Etudes, Paris, 1898–'99; Assistant in French, Ohio State University, 1895–'99. Present position since 1899.

JOHN H. SCHAFFNER.....61 West Eleventh avenue

Assistant Professor of Botany

A. B., Baker University, Kansas, 1893. A. M., University of Michigan, 1894; M. S., Baker University, 1896. Student in Botany, Zoology and Geology, University of Michigan, 1893–'95. Student in Botany and Paleo-Botany, University of Chicago, 1896–'97. Assistant in Botany, University of Michigan, 1894–'95. Professor of Natural Sciences, South Dakota University, 1895–'96; Assistant in Botany, Ohio State University, 1898–'99. Present position since 1899.

CHARLES BYRON FREDERICK.....Veterinary Hospital

Assistant in Veterinary Medicine.

V. M. and S., Ontario Veterinary College, 1893. In practice since graduation. Fellow in Veterinary Medicine, 1897–'98; Assistant in Veterinary Medicine, 1898. Present position since 1898.

CORNELIA PORTER SOUTHER.....The Dennison

Assistant Professor of Domestic Art

Graduate of Mary Institute (Washington University), St. Louis, Mo., 1883; Certificated Student at Mary Institute, 1883–'85; Handarbeitslehrerinnen-Seminar des Carola-Vereins, Leipzig, 1896–'97. Investigations in Domestic Art Methods in foreign cities, 1896–'98; Teacher of Sewing, Mrs. Ball's Private School, St. Louis, 1898; Special Student at Pratt Institute, Brooklyn, and Teachers' College, Columbia University, New York. Present position since February, 1899.

CHARLES BRADFIELD MORREY.....86 King avenue

Assistant Professor of Anatomy and Physiology

B. A., Ohio State University, 1890; Post-graduate Student, Ohio State University, 1890–'91; M. D., Starling Medical College, 1896. Assistant in Latin, Ohio State University, 1890–91; Assistant in Latin and Physiology, 1891–92; Assistant in Physiology, Ohio State University, 1892–'95; Student in Vienna and Paris, 1897–'99. Present position since 1899.

WILLIAM EDWARDS HENDERSON.....41 West Eleventh avenue

Assistant Professor of Analytical Chemistry

A. B., University of Wooster, 1891; M. A., 1894; Ph. D., Johns Hopkins University, 1897. Graduate Student Johns Hopkins University, 1893–'97. Fellow in Chemistry, Johns Hopkins University, 1896–'97. Professor of Natural Sciences, College of Emporia, Kansas, 1891–'93. Professor of Chemistry, Ohio University, 1897–'99. Present position since 1899.

GEORGE H. McKNIGHT.....748 Neil avenue

Assistant Professor of Rhetoric and English Language

A. B., Cornell, 1892, Ph. D., Cornell, 1896. Instructor in English at Cornell, 1892–'97; Cornell Traveling fellow in English Philosophy, 1897–'98. Student in Freiburg, 1897–'98. Student in Paris and London, 1898–'99. Present position since 1899.

WALTER ALEXANDER LANDACRE.....1574 Summit street
Assistant Professor of Pharmacy

G. Ph. Ohio State University, 1891. Chemist Braun Sons & Co., 1891–'97. Post-graduate Student Ohio State University, 1897–'99. Present position since 1899.

HERRICK CLEVELAND ALLEN.....The Dennison
Assistant Professor of Public Speaking

Student Union College 1894–'95–'96. LL. B. Cornell University, 1898. Instructor Department of Oratory and Debate, Cornell University, 1898,'99. Present position since 1899.

WILLIAM FINLEY LAVERY.....North Dormitory
Assistant in Veterinary Medicine.

D. V. M., Ohio State University, 1890. Veterinary practitioner, 1892–'96. Present position since 1896.

JAMES HENRY COLLINS.....57 Lexington avenue; Ruggery Building
Lecturer on Federal Practice

In practice for thirty years. Present position since 1891.

JOHN ALLEN SHAUCK.....95 Winner avenue; Supreme Court Room
Lecturer on Supreme Court Practice and Special Cases

B. A., Otterbein University; LL. B., University of Michigan, 1867; A. M., Otterbein University, 1870; LL. D., Otterbein University, 1897. Judge of the Supreme Court of Ohio.

J. WARREN SMITH.....55 Cleveland avenue
Lecturer on Meteorology

WILLIAM ABNER KNIGHT.....206 West Lane avenue
Assistant in the Industrial Arts and Instructor in Machine Work

Thirteen years' practical experience in workshops. Present position since 1893.

HARRIET TOWNSHEND.....53 West Eleventh avenue
Assistant in Library

Present position since September, 1895.

THOMAS KENYON LEWIS.....1293 Dennison avenue
Assistant in Drawing

B. Sc., Ohio State University, 1894. Graduate Student, Ohio State University, 1894–'95. Summer of 1897 and summer of 1898 at Cincinnati Art Academy. Present position since graduation.

FRANCIS LEROY LANDACRE.....1332 Highland street
Assistant in Zoology

B. A., Ohio State University, 1895. Student in Chicago University, summer quarters of 1898 and of 1899. Professor of Embryology in Ohio Medical University since 1896. Present position since graduation.

JAMES STEWART HINE.....26 West Fourth avenue
Assistant in Entomology

B. Sc. (H. and F.), Ohio State University, 1893. Superintendent of the N. W. Substation of the Ohio Agricultural Experiment Station, 1893. Assistant in Horticulture, Ohio State University, 1894. Student in Entomology, Cornell, 1895. Assistant in the Division of Entomology of the United State Department of Agriculture, summers of 1897 and 1899. Present position since 1895.

MAUD DOROTHY JEFFREY.....65 West Eleventh avenue

Assistant in Library

B. Ph., Ohio State University, 1895. Student of Library Science, Ohio State University, 1895–'96. Student of Library Science, Amherst, summer of 1897. Present position since September, 1896.

GERTRUDE STOWELL KELLICOTT.....1332 Highland street

Assistant in Library

Student, Ohio State University, 1888–'95. Student of Library Science, Ohio State University, 1895–'96. Student of Library Science, Amherst, summer of 1897. Present position since September, 1896.

ALBERT EARL VINSON.....134 West Ninth avenue

Assistant in Agricultural Chemistry

Instructor in Chemistry, Y. M. C. A., Dayton, Ohio, 1895. Present position since September, 1896.

FREDERICK EDWARD KESTER.....1473 Neil avenue

Instructor in Physics

M. E. (in E. E.), Ohio State University, 1895. M. A., Cornell, 1899. Fellow and Assistant in Physics, Ohio State University, 1895–'97. Assistant in Physics, Ohio State University, 1897–'98, held scholarship in Physics, Cornell, 1898. Present position since 1899.

FRANK RUHLEN.....North Dormitory

Assistant in Agriculture

B. Sc., (Agr.) Ohio State University, 1896.

LUCY ALLEN.....1490 Neil avenue

Assistant in Library

B. A., Ohio State University, 1897. M. A., Ohio State University, 1899. Student in Library Science under Dr. G. E. Wire, summer of 1898 at Ohio State University. Student in Harvard University, summer of 1899. Present position since September, 1898.

ALBERT V. BLEININGER.....North Dormitory

Laboratory Assistant, Department of Clay Working and Ceramics

Present position since 1898.

EDWARD EVERETT SOMMERMEIR.....1590 Neil avenue

Assistant in Metallurgy and Mineralogy

G. Ph., Ohio State University, 1898. Student Laboratory Assistant in Chemistry, 1897–'98. Present position since September, 1898.

DON CARLOS HUDDLESON.....249 West Lane avenue

Assistant in Gymnasium

G. Ph., Ohio State University, 1897. Medical Student, 1897. Summer School of Physical Training Chautauqua, 1898. Present position since 1898.

BURT BIDWELL HERRICK.....167 Tenth avenue

Instructor in Cheese Making

ELISHA SMITH .....

Assistant in Cheese Making

JOSEPH HENRY VOSSKUEHLER .....201 West Eleventh avenue

Assistant in Drawing

Designer, Gross Lithographing Co., Dayton, Ohio, 1889–'90; Draftsman, The Stilwell-Bierce and Smith-Vaile Co., Dayton, 1890–'96; Finckel & Finckel, Patent Attorneys, Columbus, 1897. Present position since September, 1898.

CLAUDE B. GUITTARD.....80 McMillen avenue

Assistant in Library

Student in Ohio State University, 1892–'96, Assistant in Ohio State Library, 1897–'98. Student in Library Science, Washington, D. C., summer of 1899. Present position since November, 1898.

WILLIAM HENRY RENCK.....910 West Rich street

Assistant in Industrial Arts and Foreman of the Carpenter and Pattern Shops.

Fifteen years' practical experience in pattern shops and foundries, seven years as foreman. Present position since 1899.

CHARLES PHILIP CROWE.....971 Highland street

Assistant in Industrial Arts and Forge Master.

Student, Ohio Business College, Delaware, Ohio; Lebanon Normal School, Lebanon, Ohio; Teacher in Public Schools of Delaware and Union Counties, two years; Forge shop experience, seven years; Manufacturer of Steel Forgings and Springs, six years. Present position since 1899.

HOMER CHARLES PRICE.....1594 Neil avenue

Assistant in Horticulture and Forestry

B. Sc. (Agr.), Ohio State University, 1897. M. S. A., Cornell University, 1899.; Fellowship in Agriculture, Cornell, 1898–'9. Present position since September, 1899.

JOHN WESLEY GROVES.....

Assistant in Civil Engineering

C. E., Ohio State University, 1898. Engineer for the C. & H. C. & I. Co., 1898–'99. Present position since October, 1899.

FRANCIS MARION HAMILTON.....1355 North High street

Assistant in Philosophy and Education.

B. A., Indiana University, 1897. Graduate Student in Philosophy and Education, Indiana University, 1897–'98. Assistant in Philosophy, Indiana University, 1897–'98. Assistant Director of Association College, Central Y. M. C. A., Chicago, 1898–'99. Fellow-elect in Psychology in Clark University for 1899–1900. Present position since 1899.

DELBERT ALONZO CROWNER.....North Dormitory

Assistant in Butter Making

FRED ALAN FISH.....229 West Eleventh avenue

Assistant in Electrical Engineering

M. E. (in E. E.), Ohio State University, 1898. Fellow and Laboratory Assistant, 1898–'99; present position since 1899.

JOHN B. SANBORN.....215 West Tenth avenue

Assistant in American History

B. L., University of Wisconsin, 1896; M. L., University of Wisconsin, 1897; Ph. D., University of Wisconsin, 1899. Graduate Student of Wisconsin, 1896–'99. Graduate Scholar in American History, University of Wisconsin, 1898–'99. Present position since 1899.

OLIVER V. BRUMLEY.....University Grounds

Assistant in Veterinary Medicine

Veterinary Surgeon's Certificate, Ohio State University, 1897. Practiced 1897–'98. Present position since 1898.

SILAS MARTIN.....1269 Dennison avenue

Assistant in Drawing

Studied Art with J. H. Witt, E. F. Andrews and Homier. Private Teacher in Art for twenty years. Present position since 1899.

†FRANK ORVILLE CLEMENTS.....
Assistant in Chemistry

MELVIN DRESBACH.....236 West Eighth avenue
Fellow, in Anatomy and Physiology

B. Sc., Ohio State University; M. Sc., Ohio State University, 1899.

FREDERICK JAMES HALE.....75 West Third avenue
Fellow, and Laboratory Assistant in Mechanical Engineering

M. E., Ohio State University, 1898.

JOHN BERNARD PARKER.....43 East Ninth avenue
Fellow, and Assistant in Rhetoric

B. A., Ohio State University, 1898. Present position since September, 1898.

EMMA LEANNA BALL.....207 West Eighth avenue
Fellow, and Assistant in Mathematics

B. Sc., Ohio State University, 1895; M. Sc., same institution, 1896.

ALFRED HEBER McINTIRE.....84 Fifteenth avenue
Fellow in Industrial Arts

M. E. (in E. E.), Ohio State University, 1898.

DONALD ALEXIS KOHR.....1590 Neil avenue
Fellow, and Laboratory Assistant in Chemistry

B. Ph., Ohio State University, 1898. Graduate Student in Chemistry and Mathematics, 1898–'99. Laboratory Assistant in Chemistry, 1898–'99.

JOHN WESLEY YOUNG.....883 Eeast Main street
Fellow, and Assistant in Mathematics

B. Ph. Ohio State University, 1899.

HAROLD WARNER BROWN.....242 King avenue
Fellow, and Assistant in Physics

B. Sc., Cornell, 1898. Present position since 1899.

†HERBERT W. KENNEDY.....164 West Ninth avenue
Emerson McMillin Fellow

SAMUEL WILLIAMSON COLLETT.....48 Woodruff avenue W
Fellow in Botany

B. Sc., Moore's Hill College, Indiana; M. Sc., Moore's Hill College, 1894; Teacher of Physiology and Chemistry, High School, and Normal College, Glidden, Iowa, 1890–'91; Professor of Natural Science, Taylor University, Upland, Ind., 1893–'96; Professor of Natural Science, Dakota University, Mitchell, South Dakota, 1896–'99.

HERBERT CHARLES GORE.....185 West Ninth avenue
Fellow and Laboratory Assistant in Chemistry

B. S., University of Michigan, 1899.

† Resigned in January, 1900.

CHARLES ARTEMUS GRATE.....1610 Highland street
Fellow and Laboratory Assistant in Mechanical Engineering

M. E., Ohio State University, 1898.

GRACE L. PITTS.....245 East Gay street
Fellow in Economics

ALICE DUFOUR.....37½ Oak street
Fellow and Assistant in Botany

Ph. B., Defiance College, 1899. Student in Botanical Department O. S. U., 1898-'99.

WILLIAM C. MILLS.....91 West Frambes avenue
Curator of Archæology

B. Sc. (H. and F.), Ohio State University, 1898. Curator and Librarian of the Ohio State Archæological and Historical Society. Museum and Library, Orton Hall, O. S. U.

CHANGES, 1900-1901

WITHDRAWN

Professor John Thomas Martin, Professor James M. Burns, Associate Professor Stella Elliott Canfield, Assistant Professor Herbert James Noyes, Assistant Professor Clair Albert Dye, Assistant Professor Edwin D. Shurter, Lecturer Faxon Franklin Duane Albery, Assistant Clark Wissler, Assistant John Ferguson Cunningham, Assistant George Washington Rightmire, Assistant Joseph K. Vosskuehler, Assistant Fred A. Fish, Assistant John B. Sanborn, Fellow and Laboratory Assistant Horace Judd, Fellow and Laboratory Assistant S. W. Collett, Fellow and Laboratory Assistant Alice Dufour, Fellow and Laboratory Assistant Donald A. Kohr, Fellow and Laboratory Assistant A .V. Bleininger, Fellow and Laboratory Assistant A. H. McIntire, Fellow and Laboratory Assistant C. A. Grate, Fellow and Laboratory Assistant F. J. Hale, Fellow and Assistant Benjamin Maag, Fellow and Assistant J. W. Young, Fellow and Assistant J. B. Parker, Fellow Edward L. Fulmer, Fellow David T. Keating, Fellow Grace L. Pitts, Fellow Emma L. Ball, Fellow William Cannan, Student Assistant J. F. Jeffrey, Student Assistant Charles F. Dowd, Emerson McMillin Scholar Wilbur E. Mann.

APPOINTMENTS

CAPTAIN GEORGE L. CONVERSE, U. S. A. (Retired).....398 Oak street
Professor of Military Science and Tactics

J. WARREN SMITH.....55 Cleveland avenue
Lecturer on Meteorology

WALLACE S. ELDEN.....
Assistant Professor of Classic Languages

EDWIN E. NOBLES.....71 West Tenth avenue
Assistant in Drawing

S. S. EDMANDS.....
Assistant in Electrical Engineering

S. E. RASOR.....
Assistant in Mathematics

HENRY DAVIES.....
Assistant in Philosophy

HARRIET BURR.....
Fellow in Botany

C. P. LINVILLE.....
Fellow in Chemistry

W. L. DUBOIS.....61 West Eighth avenue
Fellow in Chemistry

CHARLES F. KIMBERLEY.....225 Marshall avenue
Fellow in Chemistry

*B. H. HIBBARD.....
Fellow in Economics

MARY W. RICE.....844 Summit street
Emerson McMillin Fellow in Economics

J. F. TRAVIS.....1621 Neil avenue
Fellow in Mathematics

WILLIAM E. BOHN.....North Dormitory
Fellow in Rhetoric and English Language

C. L. C. MOORE.....68 West Tenth avenue
Student Assistant in Mathematics

W. E. DAVIS.....199 West Eleventh avenue
Student Assistant in Mathematics

CLARA MAUD BERRYMAN.....
Associate Professor of Physical Education

ALONZO H. TUTTLE.....
Instructor in American History

SELDEN F. SYMSER.....
Fellow in Economics

GEORGE W. FROST.....
Fellow in Mechanical Engineering

CHARLES B. SAYRE.....
Fellow in American History

N. O. FORD.....
Fellow in Metallurgy, Mineralogy and Mine Engineering

*Resigned.

CHANGES IN TITLES

SIDNEY AUGUSTUS NORTON,	Lecturer in Chemistry Emeritus Professor of Chemistry
WILBUR HENRY SIEBERT,	Associate Professor of History Associate Professor of European History
CHARLES BYRON FREDERICK,	Assistant in Veterinary Medicine Assistant Professor of Veterinary Medicine
WILLIAM FINLEY LAVERY,	Assistant in Veterinary Medicine Assistant Professor of Veterinary Medicine
MAUD DOROTHY JEFFREY,	Library Assistant Assistant in Library
FREDERICK EDWARD KESTER,	Assistant in Physics Instructor in Physics
LUCY ALLEN,	Library Assistant Assistant in Library
ALBERT V. BLEININGER,	Assistant Director of the Department of Clay Working and Ceramics Laboratory Assistant, Department of Clay Working and Ceramics
CLAUDE B. GUITTARD,	Library Assistant Assistant in Library
*FRANK ORVILLE CLEMENTS,	Fellow and Laboratory Assistant in Chemistry Assistant in Chemistry
W. D. GIBBS,	Associate Professor of Agriculture Professor of Agronomy
JOHN W. DECKER,	Associate Professor of Dairy Husbandry Associate Professor of Agriculture
MELVIN DRESBACH,	Fellow and Laboratory Assistant in Anatomy and Physiology Assistant in Anatomy and Physiology
H. C. LORD,	Director of the Emerson McMillin Observatory and Associate Professor of Astronomy Professor of Astronomy and Director of Emerson McMillin Observatory
HERBERT C. GORE,	Fellow and Laboratory Assistant in Chemistry Assistant in Chemistry
EDWARD ORTON, JR.,	Director of the Department of Clayworking and Ceramics Professor and Director of the Department of Clayworking and Ceramics

*Resigned in January, 1900.

CORNELIA P. SOUTHER,	Assistant Professor of Domestic Art Associate Professor of Domestic Art
F. C. CLARK,	Associate Professor of Economics Professor of Economics
C. S. PROSSER,	Associate Professor of Organic Geology Associate Professor of Historical Geology and Acting Head of the Department of Geology
J. A. BOWNOCKER,	Associate Professor of Inorganic Geology Associate Professor of Inorganic Geology and Curator of the Museum
F. E. SANBORN,	Director of the Department of Industrial Arts Professor and Director of the Department of Industrial Arts
WILLIAM H. RENCK,	Assistant and Instructor in Pattern Making Instructor in Pattern Making and Founding
W. A. KNIGHT,	Assistant and Instructor in Machine Work Instructor in Machine Work
CHARLES P. KROWE,	Assistant and Forge Master Instructor in Forging
W. F. HUNTER,	Dean and Professor of Sales, etc Dean of College of Law and Professor of Law
J. H. COLLINS,	Lecturer on Federal Practice Professor of Law
J. A. SHAUCK,	Lecturer on Supreme Court Practice Professor of Law
G. W. KNIGHT	Professor of Constitutional Law and Private Corporations Professor of Law
E. B. KINKEAD,	Professor of Pleading, etc Professor of Law
W. H. PAGE,	Professor of Elementary Law Professor of Law
E. O. RANDALL,	Professor of Agency, etc Professor of Law
D. F. PUGH,	Professor of Equity Juris, etc Professor of Law
E. A. HITCHCOCK,	Associate Professor of Experimental Engineering Associate Professor of Mechanical Engineering
FRANK A. RAY,	Associate Professor of Mine Engineering Professor of Mine Engineering

EXECUTIVE DEPARTMENT

1899-1900

WILLIAM OXLEY THOMPSON.....President
ALEXIS COPE.....Secretary Board of Trustees and Bursar
W. C. McCRACKEN.....Chief Engineer
KATHARINE H. DUNCAN.....Executive Clerk
EDITH D .COCKINS.....Registrar
CARL E. STEEB.....Accountant
CHARLES LOWE.....Assistant Engineer
THOMAS BOUDE.....First Fireman
W. E. CASE.....Second Fireman
JAMES KELLEY.....Lawnkeeper
BENJAMIN IRWIN.....Watchman

JANITORS

ARTHUR CHANTLER.....University Hall
HENRY CHANTLER.....Orton Hall
G. A. GOODSPEED.....Chemical Hall
JOHN H. BROWN.....Hayes Hall
GEO. C. DENNEY.....Horticultural Hall and Veterinary Hospital
D. D. GEREN.....Gymnasium
WILLIAM WHITESTINE.....Biological Hall
M. N. COOK.....Townshend Hall

THE UNIVERSITY

OHIO STATE UNIVERSITY

HISTORY

The land grant made by the United States under an act approved by President Lincoln, July 2nd, 1862, provided that there should be granted to each State an amount of public land equal to thirty thousand acres for each Senator and Representative to which the State was entitled by the apportionment of the census of 1860. The proceeds under this act were to constitute a perpetual fund the capital of which was to remain forever undiminished and the interest of the same was to be inviolably applied by each State which should take and claim the benefits of the act to the endowment, support and maintenance of at least one "College where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such a manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Governor Tod, in November, 1862, brought the subject before the State Board of Agriculture and later to the attention of the Legislature. In January, 1864, Hon. Columbus Delano introduced a bill accepting the grant. This became a law February 9th, 1864, and pledged the faith of the State to the performance of all the conditions and provisions contained therein. In 1866, an act introduced by Hon. J. T. Brooks, was passed, which provided for the establishment of the Ohio Agricultural and Mechanical College, but the provisions were not carried into effect and a second act introduced by Hon. R. P. Cannon was passed in 1870 entitled "An act to establish and maintain an Agricultural and Mechanical College in Ohio." Under the provisions of this act the institution was located in Columbus and the Board proceeded to the organiaztion of the college and the election of a Faculty of instruction, and the institution was opened for the reception of students on the seventeenth day of September, 1873.

In 1878 the legislature passed "An act to reorganize and change the name of the Ohio Agricultural and Mechanical College and to repeal certain acts therein mentioned." The act provided that the institution should be thereafter designated as "The Ohio State University." Up to this time but one appropriation had been made by the State for the support of the institution. With the reorganization came the larger and broader view of the State's relation to public education and since that time the Ohio State University has shared with other public educational institutions a more generous support by the State.

The governing body of the institution is a Board of Trustees, appointed by the Governor of the State and confirmed by the Senate, for terms of seven years, as provided in the law organizing the University. The original endowment has been supplemented, and the objects of the University promoted, by a permanent annual grant from the United States, under an act of 1890, by special appropriations of the General Assembly; and in 1891, by a permanent annual grant from the State, which grant was doubled by the legislature of 1896. In accordance with the spirit of the law under which it is organized, the University aims to furnish

ample facilities for education in the liberal and industrial arts, the sciences and the languages, and for thorough technical and professional study of agriculture, engineering in its various departments, veterinary medicine, pharmacy and law. Through the aid which has been received from the United States and from the State it is enabled to offer its privileges, with a slight charge for incidental expenses, to all persons of either sex who are qualified for admission.

LOCATION OF THE UNIVERSITY

The University is situated within the corporate limits of the City of Columbus, two miles north of the Union Depot and about three miles from the State Capitol. The University grounds consist of three hundred and forty-five acres, bounded east and west by High Street and the Olentangy river, respectively. The western portion, about 235 acres, is devoted to agricultural and horticultural purposes, and is under the management of the College of Agriculture and Domestic Science, The eastern portion is occupied by the principal University buildings, campus, athletic and drill grounds, a park-like meadow, and a few acres of primitive forest.

The grounds are laid out with care, ornamented with trees, shrubs and flower beds; and are so managed as to illustrate the instruction in Botany, Horticulture, Forestry, Landscape Gardening and Floriculture.

The University may be reached by either the North High street or the Neil avenue electric cars. Those wishing to go to the principal buildings of the University, to the residences on the grounds, or the Athletic field, should take a High street car going north. Those wishing to visit the Emerson McMillin Observatory, the Veterinary Hospital, Townsend Hall, Horticultural Hall and the Dormitories, will find the Neil avenue cars more convenient.

The University has thirteen buildings devoted to instruction, one Boiler House, one Power House, two Dormitories, six residences and some farm buildings. These buildings represent an investment for construction of about eight hundred thousand dollars. The equipment and apparatus amount to about one hundred and seventy thousand dollars. The land now occupied as a site with the farm is valued at one million five hundred thousand dollars.

BUILDINGS

University Hall contains the Executive offices, the office of the Secretary of the Trustees, the assembly room (seating twelve hundred persons), four halls for literary societies, the Y M. C. A. and King's Daughters' room, the Young Woman's League room and class rooms and laboratories for the departments of Economics, English Literature, German, Greek, History, Latin, Mathematics, Pedagogy, Political Science, Philosophy, Physics, Rhetoric and English Language, and Romance Languages. An electric passenger elevator connects all floors.

Mechanical Hall contains a room fitted up with cases for the care of models, instruments of precision, etc.; a room for instruction in laboratory mechanics and draughting, and laboratories with the engines, hydraulic plant, testing machines, etc.

Botanical Hall has on the first floor the lecture room of the department of Botany. There are also an office, a store room, a dark room, and a private laboratory for Physiological Botany. On the second floor is the botanical museum, the main laboratory and the assistant's laboratory. Connected with this building is a large greenhouse and propagating house.

Electrical Hall devotes the first floor to the dynamo room. The floor of this room is of asphalt, laid on a solid concrete foundation. On the second floor

are a lecture and draughting room, a photometric room, a library room, and office, stock and locker rooms.

CHEMICAL HALL is now occupied by the departments of Chemistry, Mining and Metallurgy and Pharmacy. The department of Chemistry occupies the middle portion of the first floor and the middle and western portion of the second floor. The main lecture room has a seating capacity for one hundred and fifty students. The laboratory for introductory work and qualitative analysis has accommodation for two hundred and sixty-four students. There is also a special laboratory for qualitative analysis with accommodations for twenty-five students. The main quantitative laboratory accommodates fifty students. There is also an organic laboratory, a room for the preparation of experiments, a balcony accessible both from the lecture room and preparation room, a room for combustion work, a dark room for spectroscopic work, in addition to a number of smaller rooms used for private laboratories.

The departments of Mining and Metallurgy occupy the east end of the building. In the basement are the smelting furnaces, the assay laboratory, a room for rough work and store room for supplies. On the first floor is the lecture room of the professor of Metallurgy, with a seating capacity for forty; a laboratory with desks for sixteen students, a store room, a balance room, a private laboratory and an office. On the second floor is the lecture room of the associate professor of Mine Engineering, a draughting room, a room for instruments and an office.

The department of Pharmacy occupies the first floor and basement in the west end of the building, and has a lecture room provided for sixty students; a preparation room, a laboratory with desks for twenty-five students; a room for supplies, a balance room, a model drug store and a private laboratory.

ORTON HALL is designed for the permanent accommodation of the large geological collection of the University and for work and instruction in the department of Geology. A portion of it is occupied by the library and reading room. The building is two stories in height, with a high basement, is built of brick and faced with sandstone, and is fireproof throughout. At the right of the main entrance is the geological lecture room and professor's private room; at the left is the University library, reading room and librarian's private room. The central and rear portion is occupied by the geological and paleontological museums. The petrographical laboratory is located on the second floor. In the basement a room is used for work in geographical modeling, the finished models being afterward placed in the collection of such models in a room set apart for the purpose on the second floor. The basement accommodates also the museum of economic geology. A paleontological laboratory or working room is also provided on the second floor.

The greater part of the basement of Orton Hall is occupied as a laboratory by the department of Clay-working and Ceramics. This department is also accommodated with a large room on the first floor for recitation and exhibition purposes. In the rear of Orton Hall is a small brick structure used for the kilns of this department.

HAYES HALL is devoted to instruction in Industrial Arts, Drawing, Civil Engineering and Domestic Economy. On the first floor are two offices, the rooms of the department of Domestic Economy and two lecture rooms, the machine shop, the forge shop and the foundry. On the second floor are the carpenter and pattern shops and six large lecture rooms, with private rooms annexed.

The department of Drawing occupies the third floor for instruction in mechanical drawing and free-hand drawing and photography.

HORTICULTURAL HALL contains recitation rooms and indoor laboratories of the department of Horticulture and Forestry. An extensive greenhouse is attached.

The Veterinary Hospital contains on the first floor a veterinary museum and library, a dispensary and two private rooms for the persons in charge. On the second floor are a class room, a bacteriological laboratory and a microscopical laboratory. The rear extension contains an operating hall and a room provided with stalls, cages, etc., for the care of animals under treatment.

The Emerson McMillin Observatory is the gift of Mr. Emerson McMillin of New York. The first floor is divided by a hall and stairway into two parts. The east wing contains an office, library, clock room and a large, well-lighted room for the students, furnished with tables, where they reduce their observations and keep the records of their work. The west wing contains the transit house, the dome and photographic dark room. The transit house is a light frame structure, so designed as to be kept as free as possible from heat radiated by any heavy walls of masonry. The dome is a wooden frame-work, covered on the outside with canvas. The rest of the building is of pressed brick, the foundation and second story being "rock-faced."

The equipment consists of a twelve-inch equatorial telescope, mounting by Messrs. Warner & Swasey, objective by Mr. Brashear, with a large and powerful spectroscope by Mr. Brashear. This instrument is adapted to use either one or two prisms or a grating, and is provided with a double set of objectives, one corrected for the visual and one for the photographic rays; a positive micrometer with a seven-inch circle by Messrs. Warner & Swasey; a combined zenith telescope and transit instrument of three inches clear aperture by Mr. G. N. Saegmüller; a sidereal clock by Clemens Riefler of Munich; a comparator by Carl Ziliss; a four inch portable equatorial by Alvan Clark; a chronograph by Warner & Swasey; sextants, chronometers, meteorological instruments, etc. In addition to the above, Mr. McMillin's gift provides for an excellent astronomical library.

Townsend Hall is devoted exclusively to the instruction given in the College of Agriculture.

On the left of the entrance is the office of the Department of Agriculture and a private office, a stenographer's room and fireproof vault. Connected with the office on the south is an assistant's room, opening into a laboratory for advanced students. At the extreme south end of this floor is a large laboratory for student-work in soils and farm crops. Connected with this laboratory is a balance room, a store room and an instructor's laboratory. On the west side of the main corridor, and connected with the instructor's room, is a large class room opening into a preparation room with a dark room. This class room is fitted with all appliances for showing lantern slides of livestock, buildings, machinery, etc. On the same side of the corridor, and on the right of the stairway leading to the basement and second floor, are the class room and instructor's room for dairying. On the right of the main entrance is the department reading room. The north end of this floor is occupied by the museum with an attendant's room.

The north end of the high basement is occupied by the dairy department. This consists of a receiving room, a pasteurizing room, a store room, a refrigerator room, a lavatory, butter-making room, cheese-making room, two cheese-curing rooms and an instructor's room.

In the south end of the basement is a livestock room about forty feet square. One third of this room is occupied by raised seats, the remaining floor space being used for exhibiting and judging livestock. Connected with this is a room fitted with stalls for the temporary accommodation of livestock when needed for class exercises. The basement also contains soil storage room, bath room, toilet rooms, repair shop, locker rooms, bicycle room and janitor's room. A small detached building will furnish steam and power for the dairy department. Detached from the main building, but connected with the soil storage room by a

tramway, is a glass house for the study of soils and the experimental growth of plants.

The north end of the second story contains a large student laboratory for the department of Agricultural Chemistry, connected with an organic and analysis laboratory, a balance room, a store room and a private laboratory. The lecture room of this department is at the south end of this floor and will seat one hundred and sixty students on raised seats, with a preparation room adjoining. There is also in this floor a class room connecting with preparation room, store room and instructor's room, which is used (temporarily) by the department of Veterinary Medicine. There is also an extra class room, ladies' toilet and locker rooms and a hall for the use of the Townsend Society, designed to seat about two hundred persons.

Biological Hall is designed for the special accommodation of the departments of Entomology, Zoology, Anatomy and Physiology, and is fully equipped with all the latest and best apparatus for this work. It consists of a basement, in which is done all the work of preparation of subjects for the lecture tables and for the special laboratory work for the advanced students; the first floor, on which are lecture rooms, general and special laboratories, and private work rooms for the professor of Entomology and Zoology and his assistants; the second floor, similarly arranged for the work in Anatomy and Physiology; and a large wing, in which is the museum and a large lecture room. The building is fireproof throughout, and in design and general appearance is one of the most attractive on the campus.

The Gymnasium and Armory was first occupied in January, 1898. The drill hall and gymnasium floor is eighty feet wide by one hundred and fifty feet long. The roof is carried on curved steel arches, lighted from a clear story at the top. There is a running track around the entire room about twelve feet from the floor, back of which is a visitors' gallery seating about seven hundred persons. At the northwest corner of the floor is a stairway leading down to the men's locker and dressing room, while the young women go down a similar way at the southeast corner to their rooms. On the levtl with the main floor, near the main entrance at the south, is a large room for the use of the Commandant and his classes and rooms for the Director of the Gymnasium. Above the Commandant's room is the room for the officers of the University Cadet Corps.

The basement is very high and well lighted. On the young men's side are dressing and locker rooms, the bath room with shower and plunge baths, a bicycle room, a lecture room, the cannon room, the band room, and a large room, which is to be the home of the University Athletic Association. On the young women's side are the locker rooms and bath rooms—precisely like those provided for the young men—a bicycle room, lecture room and private office for the instruction in sanitation and hygiene for young women.

The North Dormitory is situated at the northern limit of Neil avenue, and fronts Eleventh avenue. It is at the terminus of the Neil avenue electric car line. It is a plain structure of brick, and affords accommodation for sixty-four students.

The South Dormitory stands near Neil avenue within a few rods of the North Dormitory. It is also built of brick, and contains rooms for twenty students.

Residences. There are seven dwelling houses upon the University campus. Five of these are brick and two are frame structures. One is occupied by the President of the University, five by professors, and the seventh is the farm house.

ORGANIZATION OF THE UNIVERSITY

The Ohio State University is divided into six colleges, as follows:

The College of Agriculture and Domestic Science consists of those departments represented in the course leading to the degrees of Bachelor of Science in Agriculture, Bachelor of Science in Horticulture and Forestry and Bachelor of Science in Domestic Economy, and in the Course in Dairying.

The College of Arts, Philosophy and Science consists of those departments represented in the courses leading to the degree of Bachelor of Arts, Bachelor of Philosophy, and Bachelor of Science; and in the Courses Preparatory to Law and to Journalism.

The College of Engineering consists of those departments represented in the courses leading to the degrees of Civil Engineer, Engineer of Mines, Engineer of Mines in Ceramics, Mechanical Engineer, Mechanical Engineer in Electrical Engineering, and Bachelor of Science in Industrial Arts, Bachelor of Science in Chemistry or in Metallurgy; in the Course in Architecture, in the Short Course in Clay-Working and Ceramics, and in the Short Course in Mining.

The College of Law consists of those departments represented in the course leading to the degree of Bachelor of Laws.

The College of Pharmacy consists of those departments represented in the courses leading to the degree of Bachelor of Science in Pharmacy, and in the Short Course in Pharmacy.

The College of Veterinary Medicine consists of those departments represented in the course leading to the degree of Doctor of Veterinary Medicine, and to a certificate of Veterinary Surgeon.

Each college is under the direction of its own Faculty, which has power to act in all matters pertaining to the work of students in that college.

LABORATORIES AND EQUIPMENT

AGRICULTURE

The equipment of this department may be divided along three general lines: the plant, the museum and the illustrative materials.

THE PLANT. This consists of a farm of about two hundred acres, a general farm barn, a horse barn, and several smaller buildings. The farm lies along the Olentangy river, and includes both first and second bottom land. On this farm are grown general farm crops in the rotation deemed best suited to the circumstances of the Department. At present a few experiments are conducted, the general idea being to conduct such experiments as will have the largest instructional value to the students who attend the College of Agriculture. The Ohio Agricultural Experiment Station continues to conduct here the elaborate fertilizer experiments with wheat, corn and oats, which it has been making on this farm during the past five years. Different species and varieties of farm crops are grown to some extent for the purpose of class illustration and instruction, and it is expected to enlarge this feature.

Specimens of the draft, coach and roadster type of horse are kept and used in the farm work. The Department manages a milk dairy; having a herd of about forty cows, composed of pure bred and grade Jerseys and Shorthorns.

The general farm barn contains a well arranged stable for forty cows, with underground drainage and sewage cistern, a milk cooling room, a silo, a roof cellar, a work-shop, with room for hay, grain and other foodstuffs.

THE MUSEUM. This contains a large number of samples of farm products in various forms and their by-products, such as soils, grains, grasses, wools, cotton,

forage plants and foodstuff. Milling and other processes are illustrated by samples of the various products of manufacture.

The museum contains Auzoux models, samples of tools and a considerable miscellaneous collection. The collections are intended primarily for student use and not for display.

ILLUSTRATIVE MATERIALS. These consist of charts, pictures and lantern slides showing results of experiments, representative and noted specimens of livestock, farm machinery, fences, buildings, etc. The Department has and uses constantly in the class room a Beseler double oxygen–ether stereopticon. The collection of several hundred lantern slides for this purpose is constantly receiving additions.

THE AGRICULTURAL LIBRARY. While not considered as belonging specifically to this Department, there is in the general library a fairly good collection of books and periodicals devoted to agriculture, a large use of which is required of the student.

THE LABORATORY OF SOIL PHYSICS is located on the second floor of Horticultural Hall, and is supplied with apparatus for the mechanical analysis of soils and for testing their physical properties. (*See also* BUILDINGS — *Townshend Hall.*)

ARCHITECTURE

This work is carried on in connection with the Department of Drawing. The facilities for this work consist of a large, well–lighted drawing–room for the designing and drawing part of the work, a recitation room specially fitted with stereopticon lantern to illustrate the lectures, several hundred lantern slides of typical specimens of architecture from all parts of the world, a collection of scale design drawings, a collection of specifications of buildings that have been erected, a collection of plaster ornaments used in architectural decoration and a well selected collection of useful books in the library. The City contains many buildings of interest to the architectural student, both in a completed state and in process of erection.

BOTANY

The general Botanical Laboratory occupies a part of the second floor of Botanical Hall. It is 23x33 feet, and is furnished with both movable and fixed tables. The latter are attached to the west and south walls near windows, suitably shaded. Water, gas and an evaporating hood are also provided. The laboratory is equipped with compound microscopes of the Baush and Lomb, the Leitz and other patterns; and accompanying each is a tray of tools and a case of reagents. There are more than fifty dissecting microscopes, also charts, and several minor pieces of apparatus for experiments in vegetable physiology. Three smaller rooms are also provided as laboratories for special work, as well as a dark room for photography. Other facilities for the illustration of the courses in botany, and for practical training in the same, are: A general herbarium, including flowering plants, ferns, mosses, fungi and algae; a state herbarium, a collection of fruits and seeds, valuable timbers, woods, grasses and various economic products of the vegetable kingdom; ornamental grounds and woodland, planted with a large variety of evergreen and deciduous trees and shrubs; and a greenhouse with a fair collection of native and exotic plants. (See also MUSEUM — *The Botanical Museum;* and BUILDINGS—*Botanical Hall.*)

CHEMISTRY

The laboratories of the department accommodate from three to four hundred students. Each laboratory is equipped with all the necessary conveniences as water, gas, electric lights, distilled water piped from a large still in the attic,

steam ovens, automatic air blasts, suction pumps, etc. The department is liberally supplied with the best apparatus and materials for both lecture room and laboratory work. Each student has his own desk with drawers and locker. All supplies are procured from the chemical store room which has always on hand a complete stock of all necessary materials. (See also BUILDINGS — *Chemical Hall.*)

CIVIL ENGINEERING

The facilities provided for the illustration of the courses in civil engineering and for practical training are as follows: One high grade and three ordinary transits, four leveling instruments, solar compass, prismatic compass, improved telescope compass, Abney hand level, level and stadia rods, sight poles, chains, tapes; twenty-six improved drawing tables with 30″ by 36″ top; Schroeder's models in stereotomy of roof trusses; large set of models of wooden joints; collection of photographs of bridges, both when finished and in course of erection; collections of strain sheets and shop drawings of bridges; new improved cement testing machines and outfit for making all kinds of cement tests; stone mason tools for working models out of plaster blocks; magic lantern and slides; collections of samples of building materials; calculating machines; sets of drawing instruments; blue print room with outfit; sets of tracings of standard structures from which each student may make a set of blue prints. The equipment is growing each year by the addition of materials purchased, presented, or made by students of the Department.

CLAY-WORKING AND CERAMICS

The University is the first, and at this time the only institution in the United States offering special facilities for the study of clays, clay-working, and the chemical technology of the ceramic art. The facilities of the Department comprise: 1st. A convenient chemical laboratory, specially designed and equipped for the analysis and decomposition of silicates. Provision has been made for the use of hydrofluoric acid with safety, and the platinum ware has been made to order with this purpose in view. 2d. A complete mechanical outfit for the preparation of clays for pottery manufacture and the production of the ware itself, of any grade from earthen wares to porcelain. The machinery is of the latest types and comprises all important varieties in use for grinding, tempering, washing, filtering and molding. 3d. A similar plant for the manufacture of brick, tiles, pipes and hollow goods. The machinery here is of full size and samples up to a ton in weight can be received and transformed into the finished article by any or all of the standard methods in commercial use. The power for this purpose is derived from a fine electric motor, driven from the University power plant. 4th. A kiln house, equipped with a kiln in which several hundred bricks, or an equivalent quantity of sewer-pipe, stoneware, or pottery can be burnt. The fuel is intended to be coke, except in special cases where the fuel available for burning clay wares is to be made the subject of test. There is also provided a crucible melting furnace and a muffle furnace for testing glazes. A muffle kiln of large size for burning pottery, glazed ware and decorated wares has recently been put into operation. 5th. A ceramic museum, containing a fine collection of American pottery and clay products of every class, is in process of installation. 6th. A library of the best literature on the subject, mainly German but containing a few English and French works, and the trade periodicals. (See also BUILDINGS—*Orton Hall.*)

DOMESTIC ECONOMY

The Department of Domestic Economy (for young women) will secure for the course all that experience and observation may suggest. At present it has a large

kitchen, with dining room adjoining, each fitted with the latest and best appliances for the work undertaken. About a thousand dollars has been expended to make this department entirely practical, and to permit its instruction to be as thorough and as scientific as that of any other department in the University.

DRAWING

The Department occupies the entire third floor and one room in the basement of Hayes Hall, and is provided with the following equipment for the illustration of the work in drawing and for the practical training in same:

For freehand drawing, water color and oil painting:—A large studio thirty-five by eighty feet, specially arranged and provided with adjustable tilting tables and easels, a well selected collection of pencil, pen and ink, charcoal and color specimens of work, wooden models of geometric forms, plaster-casts of ornaments, flowers, fruit and the antique.

For clay-modeling:—A specially arranged and equipped studio twenty-six by thirty-two feet for modeling in clay and casting in plaster, consisting of modeling stands, moisture box, casting table, modeling tools of wood and steel, stove and vent-hood for the preparation of gelatine molds and lockers.

For mechanical drawing and mechanical and architectural designing:—A large, well lighted room forty by eighty-five feet, provided with O. S. U. drawing tables (30″ by 36″ tops), a set of Schroeder models, a collection of shop drawings and facilities for blue-printing.

For photography:—A well arranged and equipped dark-room, printing apparatus, copying camera, six view cameras, lenses of long and short focus, telephotographic lens, shutters for instantaneous exposures and an excellent outfit for photo-micrography.

In addition to the above, the library contains a well selected collection of books pertaining to the work of the Departments. (See also BUILDINGS—*Hayes Hall.*)

ECONOMICS AND SOCIOLOGY

The University, through the efforts and generosity of its friends, is possessed of a unique equipment for study purposes in these lines. This equipment comprises a large collection of railroad, municipal and school bonds; of stocks of all kinds; of letters of credit, drafts, foreign bills of exchange, bills of lading, checks, enclosures, statements, insurance policies, trust certificates, notes, mortgages and all the necessary forms of business paper; also collections of coins illustrative of various periods in our monetary history, foreign coins, and scrip; also sets of maps and charts and a Kiepert-Commercial Globe 80 cent. in diameter. Ample facilities for statistical work are provided and a seminary room set apart for the use of laboratory material, documents, etc., is always open to advanced students. It is the policy of the Department to make the statistical investigations and research work of advanced students contributory to the permanent equipment of the Department, thus enriching the facilities from year to year with material of scientific and pedagogical value.

ELECTRICAL ENGINEERING

The Electrical Laboratory affords very good facilities for practical experimental work with dynamo machinery and other electrical apparatus. The dynamo equipment consists of twenty-five machines of various makes and sizes from 40 H. P. down; aggregating over 200 horse power. These include direct and alternating current generators, polyphase motors, arc and incandescent lighting generators, railway and station motors and unipolar dynamo. The latter, with an alter-

nating current generator and a 2–phase motor, were built by the students; it being the policy of the Department to build as much of its apparatus as possible. There are also a number of transformers of different makes, including one for welding,—built at the University. Arc lamps of different styles, a 10–kilowatt–hour storage battery, condensers and resistances, and magnetic testing apparatus also form part of the equipment. The list of measuring instruments is quite complete, and includes a standard Weston voltmeter and eleven other Weston volt and am–meters, also four Kelvin static voltmeters, five dynamo–meters, one watt–meter, three galvanometers and a dozen other am–meters and voltmeters of different makes. A telephone laboratory—with apparatus for comparative tests, a variety of transmitters and receivers, and lines running to another building, has been in use for two years. Photometry is given at present in the Physical Laboratory, where the equipment in this line is excellent. Power for running the dynamo laboratory is supplied by three induction motors from the University Power Plant. This latter is a model 2–phase plant, and the electrical part of it has been for the most part installed by the students of the Department. The repair and maintenance of this plant is done by the students, who receive compensation for the time so spent.

GEOLOGY

The University is able to present unusual advantages for the study of Geology. By an act of the Legislature it has been put in possession of all the collections made by the late Geological Survey, and these collections have been supplemented by valuable additions of fossils and minerals from various sources. The State collection embraces a very complete representation of every geological formation shown in Ohio. In its new and ample quarters the Department offers exceptionally good opportunities for work in the lithological, petrographical and modeling laboratories. (See also MUSEUMS—*the Geological Museum*; and BUILDINGS—*Orton Hall.*)

HORTICULTURE AND FORESTRY

Among the facilities provided for the illustration of the courses in horticulture, and for practical training in the same, are: (1) a collection of horticultural tools for budding, grafting, pruning, etc.; (2) an orchard, containing well–selected varieties of the apple, pear, cherry, plum and quince; (3) a small vineyard, containing numerous varieties of the grape; (4) a garden of small fruits, containing all the best varieties of the strawberry, raspberry, blackberry, currant and gooseberry; (5) a vegetable garden, with forcing houses, cold frames, experimental plats, conveniences for irrigation, etc.; (6) small nursery and forest tree plantations, with practice rows of budding, grafting, pruning and training; (7) ornamental grounds and woodland, planted with a large variety of evergreen and deciduous trees and shrubs; (8) a greenhouse, with a fair collection of native and exotic plants; (9) a collection of preserved natural specimens, and models of fruits, seeds, woods, etc.; (10) a laboratory fairly well equipped with balances, charts and other appliances for study and research. (See also MUSEUMS—*the Botanical Museum;* and BUILDINGS—*Horticultural Hall.*)

MECHANICAL ENGINEERING

The greater part of Mechanical Hall is devoted to laboratory purposes.

The south laboratory is used for applied mechanics and for gas engineering. Here are located the machines for testing the strength and elasticity of engineering materials, and recording their physical properties automatically and autographically. Oils are tested as illuminants and as lubricants. Belts and pulleys are tested for their slippage, friction and horse–power transmitted. The gas engine plant has three engines, representing gas and gasoline, three methods

of ignition, and fly ball and inertia governors. The air is supplied by a fan through a large meter. Temperatures and pressures of air, gas and water are measured. The fresh and burnt gases are analyzed and their heating values determined by a calorimeter. The power is measured at both the indicator and the brake. The laboratory machine shop and tool room are in this room.

The north laboratory is used as a steam engineering and hydraulic laboratory. Four 35-horse-power engines give facilities for testing single and duplex condensing or non-condensing, simple or compound, throttling or automatic cut-off engines, using either a jet or a surface condenser. Pressure and vacuum guages are calibrated. Indicator springs of five makers are tested either cold or hot. Five kinds of calorimeters determine the moisture in steam before and after passing three different separators. Injectors are tested for lift, quantity, pressure and steam consumption. Steam pumps of six makes, ranging to 800 gallons per minute capacity; two centrifugal and a rotary pump, enable tests of pumps to be made and deliver water at pressures below 150 pounds to two stand-pipes, which in turn supply turbine and cascade, and Pelton water wheels, and enable experiments to be made on the flow of water through orifices, pipes, valves, etc. Three cisterns, provided with a variety of weirs up to five feet wide, give practice in measuring flowing water. A Venturi meter and a Pilot tube are also used. Ericsson and Rider hot air engines are tested. A Rife hydraulic engine, a Humphreys ram, Gem and Eureka water motors, and a pulsometer, are included in the hydraulic apparatus, all of which are connected and prepared for complete tests.

A complete set of Westinghouse air-brake apparatus, a blower and a ventilating fan, enable experiments to be performed in the flow of air. They are supplemented by tests of the heating and ventilating plants in the buildings of the campus.

In addition to the apparatus and equipment of the power plant of the University the power house at Townshend Hall contains a horizontal, return tubular boiler, two steam engines and an ammonia refrigerating machine, making the facilities on the campus for testing quite complete. Machinery, apparatus and appliances are continually being presented, built or purchased, and the student is given an opportunity to test everything under practical conditions of operation. Besides the laboratory facilities, opportunities frequently arise to test machinery, engines or boilers in the city, and in these tests the students take part.

METALLURGY

The metallurgical laboratory has all the appliances for the most modern methods of technical analysis as practiced in iron and steel laboratories, including gas analysis. A furnace room in the basement is fitted for gold and silver assaying, with improved muffle and crucible furnaces.

The lecture room in metallurgy has arrangements for projecting photographs of machines, mines and furnaces, for class illustration, and there is a large collection of such views. There is a photographic room with blue-printing facilities, where students learn to make copies of the drawings used in illustrating the lectures.

A collection of minerals and rocks with a large set of rock sections is provided for illustrating the mineralogy, as well as sets of blow-pipe apparatus for the students in determining mineralogy. (See also BUILDINGS—*Chemical Hall;* and MUSEUMS—*The Geological Museum.*)

MINE ENGINEERING

The Department is equipped with all of the latest improved instruments and apparatus used in mine engineering, surveying and the study of mine ventilation.

There is a collection of models of mine machinery and supplies, to which additions are being made which are valuable as illustrations. The draughting room is large, well lighted and provided with a desk for each student, where he is personally taught map making and the platting of actual surface and underground surveys; the making of tracings of drawings and how to make blue-prints. He is also taught the proper methods of keeping notes and all records necessary to an efficient engineers' office. The students are given practical experience by making actual surveys of coal mines and in working up their notes complete in all of the necessary details. The students are also taught how to make working drawings, plans, estimates and specifications of mining operations and equipment.

The lecture room has arrangements for projecting photographs of machines, mines and mine equipment, for class illustration, and there is a collection of such views. Also photographic room with blue-printing facilities, where students learn to make copies of the drawings made by themselves and those used in illustrating the lectures.

PHARMACY

The facilities provided for illustration of this work and for practical training are as follows: The apartments assigned to this work occupy the west end of the Chemical Hall, first floor and basement. The lecture room will accommodate sixty students, and is provided with a large lecture table and supplied with gas and water, and other conveniences for experiment. About the walls are arranged cases in which are exhibited rare and costly chemicals, curious drugs, and high-grade pharmaceuticals. Adjoining this room is the preparation room and storeroom, where the supplies and apparatus and material are kept, and where the apparatus for experiment and illustration before classes is prepared. Also adjoining this room is the professor's private laboratory. The main laboratory has desks for thirty-five students, each one provided with gas and water, and sufficient storage space for material and apparatus. The laboratory is furnished with apparatus for distilling, and reclaiming, with mills, balances, drying closets, steam vaporizers, hoods and other special apparatus for pharmaceutical work. Opening into the laboratory is the drug store. This drug store is complete, and is in itself a cabinet of official drugs, and all preparations thereof. It is provided with a prescription desk and all apparatus adapted for training in prescription work. Adjoining the laboratory is the reading room, where are kept the various pharmaceutical journals, the dispensatories, and many books of reference. Also adjoining the main laboratory is the balance room, which is well provided with analytical balances, specific gravity balances and microscope, all of which are intended for higher pharmaceutical work.

In the reading room is also a cabinet of crude drugs, which have been classified and numbered but bear no name. This cabinet is adapted to the study of pharmacognosy.

In addition to the foregoing equipment, the Department is possessed of an extensive range of apparatus, by means of which any branch of work in pharmacy can be successfully pursued. The Department is complete in all its details, and affords unexcelled opportunity for the study of pharmacy. (See also BUILDINGS—*Chemical Hall.*)

PHYSICS

The Department has an excellent equipment of apparatus, to which additions are constantly being made. The apparatus includes a large collection of pieces for illustration of the general lecture room work, but is principally chosen for accurate measurement in the laboratory. A set of standards of length, capacity and mass, sent under the act of Congress supplying such sets to the several agricultural

colleges, is in the possession of the Department. The pieces are copies of the United States standards made by the Coast Survey at Washington.

Among the principal pieces of apparatus are a dividing machine by Fauth & Co.; chronometers by Parkinson & Frodsham and by Negus, the latter a break-circuit; a chronograph by Fauth & Co.; a Hipp's chronoscope; cathetometers by Salleron and by the Geneva Society, the latter an exceptionally fine instrument; Regnault's apparatus for vapor tension, for expansion of gases and for specific heat; Melloni-Tyndall apparatus for radiant heat; standard thermometers by Baudin and others; Rutherford and Rowland, different gratings; Rowland's spectrum photographs; spectroscopes by Brashear, Browning, Apps and others; Salleron's complete apparatus for projections in polarized light; lanterns for projections by the lime light and the arc light; a variety of sound apparatus from Koenig; portable and quadrant electrometers; Kelvin galvanometers of high and low resistance; Weidemann, Kohlrausch and other galvanometers; standard resistance coils, with Cavendish laboratory certificate; several sets of resistance coils and bridges; a Kew magnetometer; Kelvin standard balances; Weston ammeters and voltmeters; standards of self-induction; standard battery cells; photometric standards and photometers; X-ray apparatus, etc.

Under the laws of Ohio, the professor of physics is *ex officio* State Sealer of Weights and Measures, and all of the standard weights, measures and balances received from the United States government are in the rooms of the Department.

PSYCHOLOGY

The facilities provided for the study of anatomy, bacteriology, histology and physiology are excellent. The laboratory is supplied with skeletons, papier-mache manikin, and many models, including models of the eye, ear, larynx, etc. The apparatus of the Department for work in bacteriology and physiology is of the best and most approved construction, and is adapted to the accurate investigation of bacterial forms, as well as to the thorough performance of the fundamental physiological experiments. Myographs, spectroscopes, microscopes and the necessary chemical outfit are also provided. For work in histology the equipment includes twenty-four individual tables for student experiments, each table being supplied with a good microscope, microscopical accessories, microscopical reagents; and for advanced work, the needed apparatus for instruction in the various methods of hardening, staining, imbedding, section-cutting and injection. The laboratory also has excellent microtomes, imbedding baths and other essentials of a histological outfit. The equipment of the laboratory makes it possible to offer a large range of work for the choice of students in advanced courses. (See also BUILDINGS—*Biological Hall.*)

PSYCHOLOGY AND EDUCATION

The psychological laboratory occupies three rooms on the fourth floor of University Hall and is reasonably well equipped for work in physiological and experimental psychology and for research in related educational lines. For the study of motor processes and development the most improved form of ergograph with complete sets of myographic, chronographic, dyamometric and pneumatic recording appliances, has been provided. A complete outfit of apparatus for the study of sensation, memory and association make it possible for students of education to acquire methods of exact observation of the various mental and motor processes involved in school work. Provision has also been made for work in comparative psychology.

SHOPWORK

The shops, which occupy the north wing of Hayes Hall, afford excellent facilities for instruction in both the practical details and the underlying principles of carpentry, pattern–making, forging, moulding, foundry work and machine work.

The carpenter and pattern shop is equipped with twenty–five benches with complete sets of carpenter tools for each and a large number of special tools for general use, twenty–three pattern–makers' turning lathes with cupboards containing the necessary turning and pattern–making tools under each, a pony planer, a buzz–planer, a circular rip and cross–cut saw, a scroll saw, a trimmer and a power grindstone.

The forge shop is equipped with twenty stationary forges with anvils and tools for each, a heating forge, a portable hand forge, a foot–power hammer, a blacksmith's drill and a punch, shear and bar cutter. The blast for the forges is furnished through underground piping by a 45″ Buffalo pressure blower, and the smoke is removed by a 55″ Buffalo exhaust fan overhead. Both of these fans are driven by a 15–horse–power electric motor.

The foundry is equipped with a 24″ Calliau cupola, the blast for which is furnished by a 30″ Buffalo blower; two brass furnaces, one 16 inches in diameter and the other 20 inches in diameter; a core oven, benches for iron and brass moulding, core making and cleaning of castings, a space for floor moulding 30 feet by 40 feet, besides all the necessary moulding tools, flasks, crucibles, ladles, tongs, etc.

The machine shop is driven by a 30–horse–power electric motor from above, and is equipped with the following tools: Twenty–eight benches for vise work with complete sets of tools, eight speed lathes, sixteen engine lathes, two planers, two shapers, a milling machine, an upright drill, a sensitive drill, grinding machines for both plane and cylindrical surfaces, tool grinders, emery wheels, etc. This machinery is furnished with all the necessary tools, and the tool room is equipped with full sets of drills, taps, dies, milling cutters, standard plugs, gauges, threads, etc., micrometers and a great variety of special tools. (See also BUILDINGS—*Hayes Hall.*)

VETERINARY MEDICINE

The Veterinary Hospital affords excellent facilities for the treatment and care of animal patients, and also gives the students the opportunity to become practically familiar with the diseases to which our domesticated animals are subject. It contains box stalls, stalls for cold water applications, a large and well lighted operating hall and a special ward for dogs. The front part of the Hospital contains a lecture room, a museum of anatomical and pathological preparations, a drug dispensary and an office. In the museum are skeletons of the horse and ox, a complete manikin of the horse, papier–mache models of various anatomical parts, pathological specimens preserved in alcohol, etc.

In the library are choice collections of works in veterinary medicine and allied sciences and also copies of the leading veterinary periodicals.

The College is well equipped for surgical work. Instruments of the latest and most approved makes are kept in the instrument room for use in operations.

In the daily clinics not only are horses and dogs presented, but also the meat–producing animals from the barn, near the College.

The bacteriological laboratory in the biological department is supplied with apparatus of the most modern and improved construction, the microscopic appliances being adapted to the most accurate work in bacteriology. (See also BUILDINGS—*The Veterinary Hospital, Biological Hall.*)

ZOOLOGY AND ENTOMOLOGY

Instruction in this department is largely by the laboratory method with lectures and use of text or reference books, the effort being to lead the student to observe and think for himself. The various courses are intended to provide instruction in the elements of the science, familiarity with methods of study and investigation, and opportunity for special research involving field, laboratory, museum and library work. The adjacent fields, wood, lake and river; the various well equipped laboratories, extensive collections and libraries furnish excellent opportunities for every phase of the study.

The Department occupies the first and third floors of the fine new Biological Hall providing two lecture rooms, one general and five special laboratories, museums, offices for professor and assistants, besides room for storage, workshops, aquaria, cold-storage, photography, etc. The laboratory equipment includes microscopes, microtomes, incubators, injectors, etc., for most approved methods of work in morphology, embryology and neurology. The collections include a fine series of skeletons, a number of large mammals, series of the birds of Ohio, of the birds of North America, of Ohio fishes, of mollusks and especially rich collections of insects particularly in Odonata Hemiptera and Diptera. (See also THE MUSEUMS—*The Zoological Museum, Biological Hall.*)

The Lake Laboratory maintained at Sandusky and open during the summer vacation offers courses of instruction and exceptional opportunities for original investigation in a very interesting and delightful locality. (See Lake Laboratory.)

THE LAKE LABORATORY

The University maintains a lake laboratory during the summer vacation at Sandusky where it occupies a convenient building, the former Hatchery building, 22x26 feet located by the city water works and close to the waters of the bay and convenient to good boarding places.

It has good facilities in the way of boats, tables, aquaria, collecting appliances, while microscopes, reagents, etc., are fully supplied from the home laboratory.

It offers for the coming season courses in botany and zoology outlined below, and also opportunities for special research in any branch of biology. The professors of the departments of Botany and Zoology and Entomolgy with their assistants will constitute the staff of instruction.

The courses will be open to students and teachers generally and students of the University may receive credit for courses equivalent to University courses.

Investigators engaged upon special problems relating to the fauna or flora of the region are given the privilege of the laboratory without charge but are expected to furnish their own microscopes or other special apparatus unless otherwise arranged. For the courses of instruction, a fee of twenty dollars will be charged which will cover all expense of instruction, laboratory supplies and use of boats and admit to two full courses of eight weeks.

COURSES IN ZOOLOGY

(a) Laboratory and field courses including dissection of type forms, aquaria and field studies with instruction in collecting and preparing material for laboratory use and permanent collections. Special attention will be devoted to fishes and their food supply.

(b) Advanced courses in Invertebrate Morphology or Embryology.

(c) Special courses in Entomology, field and laboratory work.

(d) Special course in Ichthyology devoted particularly to the lake fishes, their habits and food supplies.

COURSES IN BOTANY

(a) Laboratory and field courses including a study of type forms. The course will consist of collection trips in the field where the common species of each class are found, classification of familiar forms, study of structure and special parts of interest in connection with each group, with methods of preserving and mounting for immediate use or permanent preservation.

(b) General Botany consisting largely of Morphology and Ecology.

(c) Laboratory course; the work to be arranged.

For further information write for special circular on Lake Laboratory.

THE MUSEUMS

THE GEOLOGICAL MUSEUM of the University has been collected and arranged with reference to instruction rather than to display. The basis of it is a large and comprehensive collection of the rocks, fossils and economic minerals of Ohio. The collection embraces the following named series:

(a) An excellent representation of the leading divisions of the geological scale of the State, so far as it can be illustrated by rock specimens. The specimens represent the leading phases of each formation, and in many cases carry the characteristic fossils of the horizons from which they are derived.

(b) A collection of the animal and vegetable fossils of the rocks of Ohio. This series includes a large majority of the described fossils of our formation, and in the number are many type specimens. While all the ages of our geological history are well represented, the collection of the Upper Silurian and Devonian animal fossils is particularly rich and complete. A remarkably fine series of coal plants is also included in the museum. The list of fossils has been greatly extended in the number of species and individuals by the recent purchase of the collection of Mr. Henry Moores, of Columbus.

(c) The economic minerals of the State are also shown to excellent advantage in the museum. The coals, petroleums, iron ores, clay and building stones produced in Ohio are represented in large collections. Many of the specimens upon which chemical examinations or physical tests have been based in the work of the geological survey of the State are included here.

(d) Petrographical collections: These collections were selected with a view to their use in petrographical instruction, and embrace the Hawes collection, the Krantz collection and the Rosenbusch complete series of typical rock specimens from important centers abroad. These hand specimens are supplemented by two series of thin sections, including Voigt and Hochgesang's collections of typical rocks and of the petrographically important minerals.

In addition to the collections above described, the museum contains a great deal of valuable material in the line of general geology and mineralogy. Among other things it includes several valuable suites of ores and many fine mineral specimens.

There also belong to the museum a number of geological casts, models and maps. In this series are included a relief map of the State of Ohio, and also the models of the basins of the Atlantic ocean and Caribbean sea, prepared under the supervision of the United States Coast and Geodetic Survey.

The catalogue of the museum contains more than 10,000 entries; but as only one number is as a rule given to a fossil or a mineral species, the individual speci-

mens make an aggregate list of many thousands in addition to the catalogue list, and probably double this list.

The skeleton of a mastodon, one of the extinct elephants of Ohio, has recently been presented to the museum by N. S. Conway, of Catawba, O., on whose farm it was found. It has been mounted by Prof. H. A. Ward, of Rochester, N. Y., and proves to be one of the largest in the country.

The museum also has a mounted skeleton of *Megalonyx Jeffersonii*, one of the great ground sloths. This specimen has the distinction of being the first and thus far the only mounted skeleton of this animal in the world. The bones were discovered by Abraham Drushell and others in a swamp in Berlin township, in Holmes county, O., in 1890. They were mounted in Ward's Natural Science Establishment, Rochester, N. Y. The entire outlay involved in the purchase of the bones and in mounting them was borne by Mr. Emerson McMillin, of New York.

The Zoological Museum is located on the ground floor of the wing of Biological Hall. The foundations of a zoological museum have been laid and the work begun on a generous plan. Every effort is being made to secure and preserve excellent specimens in all groups of animals. Not only the adult animals are preserved but the preparatory stages as well, their work and architecture, in fact all that can illustrate the life-history and habits.

Among special features are the Wheaton collection of birds of Ohio, numbering about 1,000 skins; a collection of North American birds, about 1,500 skins, representing very fully the North American fauna; a number of fine specimens of larger mammals, moose, hippopotamus, deer, tiger, peccary, lion, tapir, etc., most of which have been generously donated by Sells Brothers; a collection of about 3,500 molluscan shells; a fine series of Ohio fishes; numerous reptiles, amphibians, etc.

There is an excellent series of skeletons, crania and alcoholic material for courses in comparative anatomy.

The collection of insects is being rapidly enlarged and the purchase of the Kellicott collection of Odonata makes it especially rich in that order.

Professor Osborne's private collection of Hemiptere is deposited in the Department and available to students for comparison and study.

The Botanical Museum occupies the second floor of Botanical Hall. It contains the University herbariums, both general and state, also Professor Kellerman's private herbarium of over 20,000 specimens deposited for use in the Botanical Department; a complete collection of the native woods of Ohio; a collection of the seeds and fruits of plants; a collection of native medicinal plants; a general collection of vegetable products, including seeds, textile fibres, coloring substances, etc., illustrating economic or applied botany.

The Agricultural Museum. For a description of this museum, see Buildings—*Townshend Hall.*

The Anatomical and Pathological Museum. For a description of this museum, see Laboratories and Equipment, Veterinary Medicine.

The Museum of Clay-Working and Ceramics is now in process of formation. Some excellent specimens of ceramic products have already been collected, and efforts are being made to increase the collection.

Archaeologic Collection. Orton Hall now contains the second best archæologic exhibit in the Ohio Valley, the total number of specimens owned by the Ohio State University, the Ohio State Historical and Archæological Society and by private individuals, amounting to 46,200. Although the Museum is but three years old, it has shown a remarkable growth.

Field work has been carried on in various parts of the State during the summers of 1894, 1895 and 1896, and as a result the contents of more than eighty

mounds, graves and village sites are now on exhibition. The chief exhibits, illustrating the life of ancient tribes are from Fort Ancient in Warren county, from the mound graves of the lower Scioto and from the Muskingum Valley. It is considered that in Ross county aboriginal culture reaches its highest development in the whole Ohio Valley. This fact is well attested by the presence of numerous copper objects, effigy pipes, fine ornaments and ceremonials, pottery, delicate work in polished stone and flint implements, etc.

The collection from the valley of Brush Creek and along the Ohio itself, and from the hill regions of Ohio, show a much lower grade of culture. Careful comparison of the work of man from these localities is exceedingly interesting.

There is an exhibit from Flint Ridge, illustrating the manufacture of arrow and spear heads. The Museum contains nearly 150 specimens of pottery from Missouri and Arkansas, many of which are effigies of animal, bird and human form.

The founders of the Archæologic Museum are arousing public interest in the preservation and study of Ohio antiquities; and by means of exchanges, lectures and personal solicitation, the growth of the collection is considerable.

LIBRARIES

THE UNIVERSITY LIBRARY

The University Library is located in the east end of Orton Hall. The system of department libraries prevails to a limited extent, small collections of books specially needed in connection with laboratory and class room work being deposited in several departments.

During term time the Library is open six days in the week, legal holidays being excepted. From Monday until Friday the hours are from 7:30 a. m. until 9:30 p. m.; Saturday from 7:30 a. m. until 4 p. m.

The management of the Library is vested in a Library Council which is composed of the President, the Librarian and the Deans of the six colleges.

STATE LIBRARIES

Students are privileged in being near the two State libraries.

The Ohio State Library numbers about 70,000 volumes and is a circulating one for all the citizens of Ohio. It occupies a room in the State House.

The State Law Library, also in the State House, is the largest and most complete law library in the State. It contains complete sets of the English, Scotch, Irish, Canadian, United States and State reports, statutes and digests. The important legal periodicals are on file.

CITY LIBRARIES

The students of the University, as residents of Columbus, have access to the City Library and the Public School Library, under the usual regulations. The City Library numbers 28,000 volumes. It has specially pleasant reading and reference rooms. The Public School Library numbers 35,000 volumes, and is a well selected collection of books. Students will find both libraries valuable in supplementing the University Library.

SPECIAL LIBRARY IN ECONOMICS

The University possesses a special library in Economics consisting of several hundred volumes and pamphlets. Over thirty financial, commercial and trade

journals are received and filed regularly. The business men of Columbus have contributed over $1,200 for the equipment of this commercial library.

SPECIAL LIBRARY IN ZOOLOGY AND ENTOMOLOGY

The Department of Zoology and Entomology possesses a special library the nucleus of which was the scientific library of the late Prof. Kellicott which was generously donated to the Department. This has been increased by gifts of special papers by a number of the leading investigators of the country and will be enlarged as rapidly as possible. The private library of the professor is also accessible for reference.

AIDS TO MORAL AND RELIGIOUS CULTURE

Chapel services are held daily (except Saturday and Sunday) at the University, at which the attendance of all instructors and students is expected. The services consist of singing, reading the Scriptures, and prayer.

One of the most commendable organizations in the University is a branch of the International Young Men's Christian Association, organized in 1883. It has a large membership and steadily grows in influence. Services are held weekly. New students are made cordially welcome, and young church members will here enjoy Christian influences and fellowship in college life. A University Circle of the International Order of the King's Daughters and Sons holds its meeting once a week, and includes in its membership a majority of the women attending the University. A club for the study and practice of philanthropy has recently been organized by the King's Daughters.

An effort is being made, to complete, by subscription, the fund which was begun two years ago by students, alumni and professors, for the erection of a building to accommodate the student organizations of the University.

LITERARY AND OTHER SOCIETIES

The Alcyone Literary Society, open to young men, was founded in 1874; the Horton Literary Society, open to young men, was founded in 1875; the Athenæan Literary Society, open to young men, was founded in the winter of 1896–'97. The Browning Literary Society, founded in 1883, and the Philomathean Literary Society, founded in 1894, are open to young women. These societies have commodious and well furnished apartments in University Hall. They meet weekly, and their work, offering to the student a very desirable training in composition, public speaking, and parliamentary order, is a valuable adjunct to collegiate education.

The Townshend Literary Society was established in 1883 as a technical society under the name of the Kirtland Agricultural Society. In 1894, the name Townshend was substituted. In 1898, the Society changed its constitution so as to admit any student of the University and thus became a literary rather than a technical society. It meets weekly in its commodious and well arranged society room in Townshend Hall.

The Biological Club is an organization of professors and students for mutual assistance and improvement in the line of natural science. Its meetings are regularly held every two weeks, at which papers are read, notes of observation and research presented, and current biological literature discussed.

The Chemical Association, composed of the more advanced students and instructors in the Department of Chemistry and Pharmacy, has for its object the discussion of such subjects as are of importance to students of chemistry, special

stress being placed on recent discoveries. The meetings are held semi-monthly and are of great interest. Both professors and students contribute to each program.

The Political Science Club is an organization of instructors and students in political science and history for the consideration of questions in those fields. At the regular bi-weekly meetings papers are read, researches reported, and current questions and publications in political science, considered and discussed.

The Engineering Society is a similar organization of students and instructors, holding meetings bi-weekly, for the consideration of questions in the various branches of engineering.

The Organic Evolution Club was organized in the winter of 1896-'97 by those students and members of the Faculty especially interested in the study of Evolution. The Zoological Department has a similar club known as the Journal Club.

The O. S. U. Dramatic Club was organized in 1893. Its object is to present each year to the University world one of the standard legitimate dramas. Its membership is confined to University circles.

The musical organizations of the University are: The O. S. U. Glee Club, composed of sixteen members; the O. S. U. Mandoline and Guitar Club of twenty members; the O. S. U. Banjo Club of five members; the O. S. U. Orchestra of fifteen members; the O. S. U. Male Quartet and the University Cadet Band.

The Ornithological Club encourages observation and research in the study of birds and their habits, especially of our native species. The Wheaton collections in the possession of the University forms a basis of study. The programs consist of papers and discussions and reports of observation and personal work. Anyone interested in birds is eligible to membership and visitors are always welcome. The Club meets on the second and fourth Monday evenings of each month.

The O. S. U. Sketch Club has for its purpose the promotion of art interests among the students and ex-students. Any one who is or has been connected with the University in any capacity is eligible to membership. The members meet once a week and sketch from the draped human figure. Twice a month the members present sketches illustrating some word, etc., previously selected. All work is criticised by members of the club for mutual benefit.

The English Club, composed of the instructors and advanced students of the English departments, holds bi-weekly meetings at which new books in current literature are discussed and papers on literary topics are presented.

The William F. Hunter Society, in the College of Law, meets for moot-court practice and quiz-work every two weeks.

MILITARY SCIENCE AND TACTICS

Under the law of Congress establishing the University, it is required that instruction shall be given in military science and tactics. In accordance with this provision an officer of the regular army has been detailed to take charge of the Department of Military Science and Tactics; and the Trustees have directed that all male students, except those in the Law College, and such others as may be specially excused for physical disability or for having reached the age limit of twenty-five years, shall render two years of cadet service as a condition of graduation. A uniform has been prescribed with which each member is required to provide himself; and fifty minutes a day are devoted to drill, except on those days when instruction in tactics and art of war is given.

The course of instruction is both practical and theoretical. It is given by means of a systematic drill, supplemented by lectures and recitations, and is so

arranged as to occupy five hours per week throughout the year. For purposes of drill, all students enrolled in the Department are organized in a battalion, the officers of which are selected from those students who have shown special proficiency in their University work and the work of the Department. Commissioned officers and non-commissioned officers receive certificates of satisfactory service, issued by the University. A cadet band has been organized in connection with this Department, and is supplied with instruments belonging to the University and to the cadets.

The practical course in infantry embraces all the movements prescribed by the drill regulations of the U. S. Army applicable to a battalion. Instruction in artillery embraces such portions of the United States drill regulations as pertain to the formation of detachments, manual of the piece, mechanical maneuvers and aiming drill. Instruction also includes duties of sentinels, the various ceremonies performed by troops, and military signaling. The theoretical instruction includes a systematic and progressive course in drill regulations of the U. S. Army, the organization and administration of the U. S. Army and the elementary principles governing in the art of war.

Competitive drills are held yearly for two medals; one, the first prize, of gold, presented to the University by the M. C. Lilley Co., of Columbus, Ohio; the other, the second prize, of silver, presented by Lieut. Wilson, when commandant. These medals remain the property of the University, the winner wearing them until the next competition. The "President's Prize" consists of an officers' sword, given to the captain of the company having the best record for attendance for the year.

The equipments of the Department consist of three hundred Springfield cadet rifles and sets of infantry equipment, twenty officers 'swords and belts, the necessary equipment for instruction in signaling, and a few instruments for the band.

The U. S. Ordnance Department furnishes an annual allowance of one thousand rounds of ball and one thousand rounds of blank cartridges for cadet rifles.

PHYSICAL TRAINING

Competent instruction in hygiene and general sanitation is given by the director of the Gymnasium, who has entire charge of the physical training and well-being of all students. Supplementing this work, the practical instruction in military tactics is found to be a most valuable aid. In addition to this, the University grounds afford excellent opportunities for general athletics, and the students support well organized clubs in base ball, foot ball and lawn tennis. These and other sports are participated in by large numbers, and friendly contests are occasionally held with other colleges. Besides the special clubs named above, the students have an athletic association which holds an annual "Field Day," in which prizes are given to the victors in the various contests usual on such occasions.

OHIO FORESTRY BUREAU

This Bureau has been established and located at the University by the Legislature for the purpose of inquiring into the best means of preserving and utilizing the forests of the State.

TERMS AND VACATIONS

The first term of the University year 1900-1901 and thereafter will begin on the Tuesday following the sixteenth day of September and will close on the

Wednesday following the 17th day of June. The first term will close on the Wednesday preceding Christmas; the second term will begin on the Tuesday following the first day of January and will close on the Friday preceding the first Monday in April; the third term will begin on the Wednesday following the close of the second term. The second semester will begin on Monday of the eighteenth week preceding commencement week; and the first semester will close on the Friday preceding the opening of the second semester.

Regular college exercises will be suspended from 4 o'clock p. m. of the Wednesday preceding Christmas until 8 o'clock a. m. of the Tuesday following the first day of January; on Thanksgiving and the day following; on University day which is the twenty-second day of February; from 4 o'clock p. m. of the Friday preceding the first Monday in April until 8 o'clock a. m. of the Wednesday following the first Monday in April; and on Memorial Day.

FEES

THE COLLEGES

INCIDENTAL FEE.—A charge of fifteen dollars a year is made against all students, under the head of incidental expense. In the case of former students if this fee is not paid until the second day of the term one dollar will be added, and for each succeeding day of delinquency fifty cents will be added.

LABORATORY FEES.—Students in the laboratories and shops are required to pay fees to cover, in part, the cost of the material consumed, and the deterioration of the expensive instruments used by them. The fees charged per term in the laboratories mentioned below are as follows:

Agriculture, 6	$10 00
" 15	5 00
Anatomy and Physiology, 53, 54, 55, 56, 59, 60	7 50
" " (Vet. Medicine) 4	5 00
Botany, 4, 6, 7, 8, 6a	2 00
" 53, 55, 57, 58, 59, 60, 64	3 00
" 56 (half semester)	1 50
Ceramics, 1, 2, 3, 7, 8	1 50
" 9, 10, 11, 12	5 00
Chemistry, 8, 14, 16, 61b, 11, 18, per term $1 50, per semester	2 25
" 61a Lab	1 50
Domestic Science, 1, 2, 3, 4, 11, 12, 13	5 00
" " 5, 6, 7, 8, 9	1 00
Drawing, 7	2 00
Elec. Engineering, 4, 5, 4 or 5 hrs., $7.00; 3 hrs. or less	5 00
" ", 6 and 7 combination	5 00
Gymnasium, per term, $1.00; per semester	2 25
Law of Contracts (Engineering)	5 00
Law when elected 5 hours or less, per semester	7 50
Metallurgy, 3, 5, 6	1 50
Mechanical Engineering, 12, 13, 14, 15, 16, 17, 23, 24, 25	5 00
Pharmacy, 7, 8, 9, 10, 11, 15, 17, 18, 51	1 50
Pharmacy, 52	2 25
Physics, 5, 6, 7, 9, 3hrs., $5.00; over 3 hrs	7 00
Physics, 55, 56, 57, 58, 60, 3 hrs., $7.50; over 3 hrs	10 50
Shopwork, 4 hrs, or less	5 00
Shopwork, 5 hrs. or more	7 00

Zoology and Entomology, 53, 54, 55, 56, 61, 62	$7 50
Zoology and Entomology, 57, 58, 59, 60	4 50
Zoology and Entomology (Agriculture), 4, 7	1 00

The fees of the College of Law are $30 per semester, including the usual incidental fee.

In the laboratories of the Department of Chemistry and Agricultural Chemistry, each student is required at the beginning of each term to pay a fixed charge of one dollar and fifty cents for gas and water ($2.25 each semester). He is also required to buy his own supplies, as he needs them, at the general storeroom in Chemical Hall, where laboratory supplies are sold to students at first cost to the University.

All term dues must be paid at the opening of each term as a condition of admission to classes.

AUDITOR'S FEE

On presentation to the Bursar of the written consent of the head of a department, and on payment to the Bursar of an auditor's fee of one dollar, any person engaged in teaching is permitted to attend, in that department, any class or course (not to exceed three hours a week for one-half year) which is announced to be especially for teachers or those intending to teach.

Graduation Fee.—A fee of five dollars, to cover expense of graduation, diplomas, etc., is required of each person receiving one of the ordinary degrees from the University, and this fee must be paid before the degree is conferred. A like fee of ten dollars is charged to each person receiving one of the higher graduate degrees.

Free Scholarship in Agriculture and Domestic Science, and in Veterinary Medicine.—A free scholarship, good for the two-year Courses, or for the First year of the Short Courses and the First year of the four-year Courses in the College of Agriculture and Domestic Science, is granted to one student annually from each county in Ohio. Each scholarship is valid two years from its grant, and covers the incidental fee and all laboratory fees (except gymnasium fee), but the person appointed to receive its benefits is subject to all the other conditions prescribed for admission to the Course. If in any county there is no applicant for the free scholarship in Agriculture, then a free scholarship, good for two years in the College of Veterinary Medicine, may be granted, subject to the same conditions as are prescribed for the free scholarship in Agriculture. The appointments are made by the county boards of agriculture, and are not transferable by the appointees. To learn whether the scholarship of a given county for the current year has been granted, inquiries should be addressed to the Secretary or President of the County Agricultural Society. For further information concerning these scholarships, inquiries should be addressed to the Dean of the College of Agriculture and Domestic Science.

THE COLLEGE OF LAW

Incidental Fee.—An incidental fee of fifteen dollars per year is charged to regular undergraduate students.

Upon payment of the incidental fee, law students will be admitted to all the privileges of all the other Colleges of the University, upon the same terms as to admission, discipline, character of studies selected, etc., as other students in the University.

Tuition Fee.—In addition to the incidental fee named above, a tuition fee of twenty-two dollars and fifty cents per semester is charged to regular undergraduate students.

GRADUATE FEE.—A graduate fee of fifteen dollars per semester, payable in advance, is charged to all who take the full graduate work.

DIPLOMA FEE.—A fee of five dollars (to cover the expense of graduation, diplomas, certificates, etc.,) is charged to all who receive the diploma or certificate, and a fee of ten dollars is charged to those taking the degree of Master of Laws. These fees must be paid before the degrees are conferred or certificate delivered.

Special students are required to arrange their fees satisfactorily with the Dean or Secretary before being admitted.

OTHER EXPENSES

There are two dormitories on the University grounds for the use of students. Each occupant is charged by the University a rent of a dollar and a half a term.

The South Dormitory affords unfurnished rooms to such students as desire to board themselves, and thus to reduce their expenses to a minimum. The expense of living in this way is about two dollars per week. Applications for rooms should be made to the President of the University.

The North Dormitory will accommodate more than sixty students. Board, furnished rooms, fuel, light and washing are, at present prices, supplied for about three dollars and fifty cents a week. Students will be admitted on special recommendation to the President of the University.

Boarding clubs are also formed in the neighborhood of the University. Furnished rooms are rented at seventy-five cents to one dollar a week for each student, and the cost of table board is two dollars to three dollars a week.

Board with furnished rooms can be obtained in private families, within convenient distances of the University, at rates varying from three and a half dollars to five dollars a week. The ruling rate may be taken as four dollars.

The uniform with which the members of the battalion are required to provide themselves costs (without overcoat) about fourteen dollars. It is quiet in pattern, and is designed to be worn daily in place of civilian dress.

The expenses of a student in the University for a year may be estimated as follows, excluding clothing (except uniform) and traveling expenses:

	Low	Average	High
Incidental fees	$15 00	$15 00	$15 00
Laboratory fees	15 00	20 00	54 00
Books and stationery	15 00	25 00	40 00
Room	4 50	37 00	75 00
Furniture	10 00	.....	.....
Board	70 00	110 00	150 00
Uniform	14 00	14 00	14 00
	$143 50	$221 00	$348 00

The second and third estimates for room include light, fuel and care. The third estimate is for a room occupied by a single student. The requirements for laboratory fees and books depend upon the course of study pursued.

SELF-SUPPORT

There is a large amount of work upon the University farm which is assigned to students, preference being given to those who are studying Agriculture. *But the University cannot promise work to all applicants.* Many students find work in private families, in offices, and in various occupations, by means of which they

defray at least a portion of their expenses. A person of ability and energy, who is master of a trade, or who can do good work of any kind, can generally find remunerative employment. It has seldom been known that any student of ordinary energy and industry was obliged to leave the University because of a lack of money for necessary expenses, *after having been say sixty days on the ground*—or long enough to inform himself as to the opportunities for securing employment. An employment bureau is maintained at the University, where the names of those seeking work and of those desiring workers are recorded.

For further information, address "Executive Office, State University, Columbus, Ohio."

THE COLLEGES

THE COLLEGES

ADMISSION

The University is open on equal terms to both sexes.

The entrance examinations for 1900 will be held on Monday and Tuesday, June 11 and 12, and on Monday and Tuesday, September 17 and 18. A part of the examinations may be taken in June and the remainder in September. Conditions incurred at the June examinations must be removed at the September examinations.

Applicants for admission to the Colleges of Agriculture, of Arts, Philosophy, and Science, or of Pharmacy, must be at least sixteen years of age; for admission to the College of Engineering or of Veterinary Medicine must be at least seventeen years of age; for admission to the College of Law must be at least eighteen years of age. Each must be provided with credentials of scholarship from his last instructor or from the last institution with which he has been connected, and with a certificate of good moral character.

There are three modes of admission to the University:

1. Certificates of the preparatory departments of Colleges of approved standing and of Normal schools in Ohio are accepted, if found satisfactory, in lieu of examination for preparatory studies, under the following conditions:

Each certificate must contain a detailed statement of the studies pursued, the text books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination, and the applicant's rank or standing in it. A copy of the course of study should accompany the certificate; and both should be sent to the University not later than the first of September. *The University cannot promise this recognition to those certificates presented during entrance week.*

Blank certificates will be furnished on application.

Applicants for admission who come from other Colleges or Universities are required to bring certificates of honorable dismissal.

Teachers' certificates (in force) will be accepted at their face value.

2. From time to time the University approves the courses of study in certain High Schools of the State; and the graduates of these High Schools are admitted on certificates in accordance with following rules:

Rule 17. Upon request from the Board of Education or the Superintendent of Public Schools of any town in Ohio for the inspection of the High School, the Faculty shall appoint a committee of two of its own number to visit such school. This committee shall thoroughly inspect the school to ascertain whether its graduates may be reasonably supposed to possess the necessary qualifications for admission to the University. After such inspection, the committee shall report its conclusions in writing, with the reasons therefor, to the Faculty, which shall then decide by vote whether the graduates of the school shall be admitted without examination, such privilege, if granted, not to extend beyond the period of three years without re-examination of the school.

Rule 94. Such diplomas and certificates shall be accepted in lieu of examination for preparatory studies only under the following conditions:

(a) The certificate must state in detail the studies pursued, the text-books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination in it, and the rank or standing of the candidate in it.

(b) The certificate will be accepted for such studies only, or such part of each, as it shall show to have been satisfactorily accomplished.

(c) Every such certificate must be accompanied with a diploma showing that the candidate has completed the course of study in the school from which he comes. But the General Faculty may except from this condition schools whose work is known to be exceptionally good, provided that the candidate has attended the school two full years.

(d) In case the authorities of any high school, academy or normal school in Ohio desire to have a definite standing fixed for the admission of its graduates, a committee of the General Faculty will visit the school, and on the report of this committee a standing will be fixed for the graduates of the school. Such standing shall not be good, without re-examination, after three years.

(e) Whenever, after a sufficient trial, it becomes evident that the graduates of any school are not adequately prepared, the diploma and certificate of such school will no longer be accepted.

Rule 95. No applicant for admission to the University will be accepted who is deficient or conditioned in required entrance work representing in the aggregate more than one daily recitation for a year. In the case of candidates for admission to the College of Arts, Philosophy and Science, not more than two-thirds of this deficiency may be in any one subject; and in the case of candidates for admission to the College of Engineering, not more than one-third of this deficiency may be in mathematics.

3. All other applicants are subject to examination on the groups of study mentioned below under the headings of those Colleges and Courses in the University which they desire to enter.

Full equivalents for the text-books named will be accepted.

ADMISSION TO SPECIAL STUDIES

Students who desire to pursue special lines of work in any of the Colleges of the University, and do not desire to become candidates for degrees, will be admitted on the following conditions.

Rule 96. Students who desire to pursue special lines of work in the University, and do not desire to become candidates for degrees, will be admitted on the following conditions:

(a) The regular entrance examinations must be satisfied.

(b) But applicants who are not less than twenty-one years of age (eighteen years in the College of Engineering and of Pharmacy), after obtaining credit for the common English branches, may be excused from examination in such studies as may be deemed best by the Executive Committee of the appropriate college; provided, that if any such student afterwards becomes a candidate for a degree he shall pass the omitted examinations at least one year before the degree is conferred.

Rule 97. Students desiring to pursue special lines of work in the University shall, upon admission, lay before the Executive Committee of the appropriate college for approval or modification, a written statement of the end they have in view, the studies proposed for the attainment of that end, and the probable period of residence at the University. Such students shall be held as regularly to their

accepted schemes of work as are regular undergraduates to their prescribed courses of study. Admission will be refused to, or withdrawn from, all of whose definiteness of purpose the Executive Committee fail to receive satisfactory evidence.

ADMISSION TO ADVANCED STANDING

Rule 98. Applicants for advanced standing who do not come from some other university or college will be examined in the studies preparatory to admission to the appropriate college, and also in such undergraduate studies as they may wish to be credited with in advance. Applicants who have completed at least one years' work in an approved college, and who bring explicit and official certificates describing their courses of study and scholarship, and letters of honorable dismissal, will be admitted without examination, except such as may be necessary in order to determine what credit they are to receive for work done in the college from which they have come, and what courses of study they may with profit pursue in the University.

GRADUATION

Rule 99. No one will be admitted to candidacy for a degree at any Commencement who has not done the last year of work required for the degree, in residence at this University, and no student will be registered in such candidacy later than the first day of October.

Rule 128. Except by unanimous consent of the Faculty, no candidate for graduation will be recommended for a degree whose record is not in all respects complete by the Friday evening previous to the Commencement Day at which he seeks the degree; and all students shall be notified of this rule at the beginnig of their graduation year, and the rule (except the last clause) shall be printed in the annual catalogue.

Rule 137. No candidate for graduation will be permitted to register for the second term or semester of his graduating year except upon presentation to the Bursar, of the President's certificate that his thesis subject has been announced and approved.

XI. EXAMINATIONS AND STANDING

Rule 111. Students shall be regarded as strictly on probation until they have removed all deficiencies and conditions in entrance requirements.

Rule 112. Students who have any entrance conditions outstanding at the beginning of the third year of residence at the University will not be allowed to join their classes until such conditions have been removed.

Rule 116. The standing of students in each study shall be reported at the end of each term or semester, as "merit," "passed," "conditioned," or "failed." This standing shall be determined by the head of each department by such means and methods as he may choose, but no student shall be reported "failed" without having had the opportunity of a written examination.

Rule 117. The standings "merit" and "passed" indicate that the student has full credit for the term's or semester's work in the study in which this standing is obtained.

Rule 118. The report "credit" (K) shall be used only for work done in regular class at the University.

Rule 119. The standing "conditioned" indicates that credit for the term's or semester's work in the study in which the condition was incurred is withheld. In the following term the student shall be given an opportunity to obtain credit

by a special re-examination; or, if the study be a continuous one, the instructor in charge may, at his discretion, excuse the student from re-examination, and may allow him to obtain credit by pursuing the study successfully during the following term or semester. If the student thus excused from re-examination does not pass upon the work of the second term or semester, he shall be reported as "failed" in the work of both terms or semesters. Any condition that is not removed within one year from the beginning of the term or semester in which it was incurred shall lapse into a "failure."

Rule 120. The standing "failed" indicates that the student has obtained no credit whatever for the term's or semester's work in which the mark is given. The student must, at the first opportunity, repeat in class the study in which he has failed. But a student who has failed in an elective study may be excused from repeating such study by the Executive Committee of his college. In case of failure in any continuous study, the work of the term or semester in which the failure is incurred must be repeated in class before any subsequent term's or semester's work in that study can be commenced. Unexcused absence from any regular examination is construed as a failure therein.

Rule 121. Any student who fails at the end of any term or semester to secure full credit for two-thirds of his work shall be put on probation for the following term or semester with restricted work, and, if similarly delinquent in his studies at any time within the next ten academic months, shall thereby cease to be a member of the University.

Rule 122. If, for any cause, the preparation, progress or success of any student in the work assigned him be found unsatisfactory, the President may remove him from a class or dismiss him from the University.

ADMISSION TO GRADUATE WORK

Graduates of this or other institutions may, on application to the Faculty, enter the University and pursue such lines of work as may be arranged or approved by the appropriate collegiate committee. Such graduate students are subject to all the ordinary regulations (as to fees, attendance, etc.), prescribed for undergraduates.

IN THE COLLEGES OF AGRICULTURE AND DOMESTIC SCIENCE, ENGINEERING, LAW AND PHARMACY

Masters degrees are conferred upon graduates in Agriculture, Horticulture and Forestry, Engineering, Law and Pharmacy at the end of not less than one year's residence, which shall be wholly devoted to the completion of an approved course of study in the University. Each is required in addition to present an acceptable thesis upon some subject connected with his course of study.

IN THE COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

1. The degree of Master of Arts will be conferred upon candidates holding the degree of B. A. or B. Ph. from this University or from other institutions making equivalent requirements for those degrees, upon the satisfactory completion, during not less than one year of residence (devoted exclusively to such work), of an approved course of study, covering a major subject and an allied minor subject. The major subject (two-thirds) shall be graduate work, taken in one of the departments of the Arts, Philosophy and Science College. The minor subject (one-third) may be in graduate work.

2. The degree of Master of Science will be conferred upon candidates holding the degree of B. Sc. from the General Science Course of this University or from institutions making equivalent requirements for this degree, and also upon graduates from the College of Engineering of this University, upon the terms specified for the degree of Master of Arts; except that the major subject must be taken in one of the Departments of Science in the Arts, Philosophy and Science College. The minor subject must be in an allied Science.

3. The degree of Master of Arts will be conferred upon candidates holding the degree of B. A. or B. Ph. and the degree of Master of Science upon candidates holding the degree of B. Sc. from this University or from other institutions making equivalent requirements for these degrees, and the degree of Master of Science will be conferred on graduates from the College of Engineering of this University, on the completion, during not less than one year of residence of a course of study in one or more of the departments of the College of Arts, Philosophy and Science, not less than one-third of which course must be graduate work and not more than two-thirds may be such undergraduate work as is announced to be elective, such course to be subject to the approval of the Executive Committee of the Faculty of the College of Arts, Philosophy and Science. But a degree conferred under the provisions of this paragraph shall in no case be counted towards the degree of Doctor of Philosophy, or Doctor of Science.

4. With the consent of the Faculty the work of candidates for the Master's degree may be distributed over more than one year.

5. Each candidate for a Master's degree must also prepare and submit a thesis, and after its acceptance, be examined upon the work assigned him.

6. The degree of Ph. D. or of D. Sc. will be conferred upon holders of the appropriate baccalaureate degree from this University, or from other institutions making equivalent requirements for the first degree, upon the satisfactory completion of three years of resident graduate work in the Arts, Philosophy and Science College, including thesis and examinations. Holders of the degree of Master of Arts or Master of Science from this University, under the conditions prescribed in paragraph one or two, or from other institutions making equivalent requirements for these degrees, may receive the Doctor's degree on the satisfactory completion of two years of resident graduate work after obtaining the Master's degree. On approval of the Faculty, the work of the first year or of the first two years, of the three, may be done at another University which offers equivalent graduate work.

7. Candidates for the degree of Doctor of Science must take their work wholly in Science.

8. With the consent of the Faculty the work required of candidates for Doctor's degrees may be distributed over more than three years.

FELLOWSHIPS

To encourage graduates of this University, and of other similar and approved institutions in this state, to continue their work and to complete the courses necessary to second (and other) degrees, the University authorities have established fellowships in several departments. These demand about one-half of the time of the fellow for laboratory instruction or other similar assistance—as far as possible, along the line of his graduate study. The remainder of his time is given to graduate work. The fellowships pay from $250 to $300 for the University year.

Rule 151. So far as student work is concerned, Fellows shall be subject to the regulations of the various colleges in regard to graduate students.

Following are the fellowships for the academic year 1899–1900 as far as at present determined:

Anatomy and Physiology, Botany, Chemistry (two), American History and Political Science, Industrial Arts, Mathematics (two), Mechanical Engineering, Philosophy, Rhetoric and English Language, Veterinary Medicine.

In addition to these, Mr. Emerson McMillin has established two fellowships: one in Astronomy, $300 for the academic year; and one in Economics, $250 for the academic year. No service is required in these fellowships, and fellows are expected to give their entire time to their graduate work.

Correspondence should be directed to the Executive Office of the University.

PRIZES

Through the generosity of Hon. William J. Bryan an annual prize of fifteen dollars is offered for the best essay on the principles underlying the form of government of the United States. Competition for this prize is open to all students of the University.

The Edward Thompson Company offer annually to the student writing the best essay on a legal theme selected by the Faculty of the College of Law, the second edition of the English and American Encyclopedia of Law, which includes about thirty volumes.

Other prizes are offered in special departments, for which see department circulars or the heads of the departments

GENERAL RULES FOR STUDENTS

Rule 51. Each student shall at the beginning of the year give, in writing, his or her local address to the President, and shall promptly report all subsequent changes of address.

Rule 53. Smoking is prohibited in the halls, basements, and lecture rooms of the University buildings.

Rule 56. The rooms of University student organizations which are located in the University buildings shall not be used for purposes other than the usual exercises of such organization without the previously obtained consent of the General Faculty.

Rule 57. No arrangements or announcements shall be made by students for any public gathering or exercises in the University buildings without the previously obtained consent of the President.

Rule 66. All absences of individual students from the city, for any purpose, involving absence from college exercises, must be accounted for to the President; and in all possible cases permission must be previously obtained.

Rule 86. All students are required to register on the first day of each term or semester.

Rule 88. In the case of former students, if the incidental fee is not paid until the second day of the term or semester, one dollar will be added, and for each succeeding day of delinquency fifty cents will be added.

Rule 89. The assignment of work shall be made and recorded for each student, as shall be determined by the several faculties; but at the beginning of each term or semester, each student's card shall be signed by the Secretary of his College before presentation to the Bursar.

COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE

FOR ADMISSION

The following are the requirements:

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following Books, or equivalents: Shakespeare's *Merchant of Venice, Julius Caesar and Macbeth*; Milton's *Lycidas, Comus, L'Allegro*, and *Il Penseroso*; Burke's *Conciliation with the Colonies*; Macaulay's *Essays on Milton and Addison*; The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of all of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Venable's Easy Algebra, complete.

4. *Botany*—Gray or Kellerman's Elementary Botany and Spring Flora, or equivalent.

7. *Latin*—Pronunciation (the Roman method): Grammar (an exact knowledge of the inflections is essential); Cæsar, the first four books of the *De Bello Gallico.*

Or *French*—The whole subject of French Grammar. Applicants will be expected to read at sight easy French and to translate correctly into French simple English sentences. Two years ought to be given to this study, the first year being spent mainly on the Grammar with easy reading; the second devoted to reading good Modern French, with grammatical analysis and exercises in writing. The texts read should be chiefly narrative and conversational prose; one or more prose comedies of the nineteenth (*not* the seventeenth) century should be included.

Or *German*—Joynes-Meissner's or Thomas's Grammar is recommended. The essentials in these grammars should have been mastered thoroughly, i. e., declensions of nouns and adjectives, pronouns, comparison of adjectives, prepositions, regular and irregular verbs and essentials of syntax.

The following books or their equivalents must have been read (not less than 600 pages.)

Joynes's or Whitney's Reader, Hillern, Höher als die Kirche, Riehl, Der Fluch der Schönheit, Freytag, Die Verlorne Handschrift, Gerstäcker Irrfahrten.

Until the year 1902, the *German* or *French* required for admission may be begun at the University, but without University credits. For the year 1902 and thereafter, the full requirements as above stated will be held to.

5. *Plane Geometry*—White, Venable, Wentworth, or Wells.
6. *Physics*—Gage, Carhart and Chute, Avery, or Appleton.
7. Either of the following:
   Civil Government—Fisk or Thorpe preferred.
   History—Myers's *General History.*

OUTLINE OF THE COURSE IN AGRICULTURE

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Agr'l Chemistry (1) Principles.	5.	Agr'l Chemistry (8) Organic.	5.	Agr'l Chemistry (9) Applications.	5.
Botany (6) Physiological.	5.	Botany (7) Physiological and Economic.	5.	Botany (8) Economic Botany and Vegetable Pathology.	5.
Drawing (10)	2.				
Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.
		Shopwork (1)	3.		
Zoology (1) Invertebrate.	3.	Zoology (1) Invertebrate.	3.	Zoology (1) Vertebrate.	3.
Cadet Service (men).*		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

SECOND YEAR

REQUIRED

Agriculture (8) Breeds of Live Stock.	4.	Agriculture (9) Principles of Breeding.	4.	Agriculture (10) Stock Feeding.	4.
Agr'l Chemistry (4) Laboratory.	5.	Agr'l Chemistry (4) Laboratory.	5.	Agr'l Chemistry (4) Laboratory.	5.
Horticulture (1) Elements.	4.	Shopwork (2)	3.	Horticulture (1) Plant Propagation.	4.
Physiology (1) Anatomy.	3.	Physiology (1) Physiology.	3.	Physiology (1) Physiology.	3.
Zoology (2) Economic Entomology.	4.	Zoology (4) Economic Entomology.	2.	Zoology (4) Economic Entomology.	2.
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

* A rule of the Board of Trustees requires each male student (except students in the College of Law) to render two years' cadet service as a condition of graduation. Students physically incapacitated for cadet service will be assigned an equivalent in special gymnasium work. The President has authority to excuse from cadet service under certain conditions.

Young women are required to carry Hygiene and Physical Training in place of cadet service.

THIRD YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Agriculture (11) Farm Equipment.	4.	Agriculture (12) Soils.	4.	Agriculture (13) Crops.	4.
				Drawing (16)	3.
†French (1) Elementary, or †German (1) Elementary.	4.	†French (1) Elementary, or †German (1) Elementary.	4.	†French (1) Elementary, or †German (1) Elementary.	4.
Geology (2) General.	5.	Geology (5) General.	3.	Astronomy (3) Meteorology.	2.
Veterin'y Medicine (28)	5.	Veterin'y Medicine (29) General Pathology.	5.	Veterin'y Medicine (30) Special Pathology.	5.

FOURTH YEAR

REQUIRED

Agriculture (14) Animal Mechanics.	4.	Agriculture (15) Dairy.	4.	Agriculture (16) Rural Economics.	4.
History (5) U. S. Political.	4.	History (5) U. S. Political.	4–2.	Economics (2) Political Economy.	4.
		Economics (2) Political Economy.	4–2.		

ELECTIVE

Ten hours a week through the year, including two hours for thesis, chosen from any of the courses given in any College of the University upon which the student is qualified to enter; except in the College of Law.

THESIS

As a requisite for graduation each candidate must present an acceptable thesis embodying the results of a special research. The subject must be announced to the President of the University (dependent upon the written approval of the head of the department in which it lies) not later than the beginning of the second term of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

† Where credit is received for Elementary French or German, French (2) 4 hours or German (4) 4 hours is required.

OUTLINE OF THE COURSE IN HORTICULTURE AND FORESTRY

FIRST YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Agr'l Chemistry (1) Principles.	5.	Agr'l Chemistry (8) Organic.	5.	Agr'l Chemistry (9) Applications.	5.
Botany (6) Physiological.	5.	Botany (7) Physiological Economic.	5.	Botany (8) Economic Botany. Vegetable Pathology.	8.
Drawing (10)	2.				
Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.
		Shopwork (1)	3.		
Zoology (1) Invertebrate.	3.	Zoology (1) Invertebrate.	3.	Zoology (1) Vertebrate.	3.
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

SECOND YEAR

REQUIRED

Agr'l Chemistry (4) Laboratory.	5.	Agr'l Chemistry (4) Laboratory.	5.	Agr'l Chemistry (4) Laboratory.	5.
*French (1) Elementary, or *German (1) Elementary.	4.	French (1) Elementary, or German (1) Elementary.	4.	French (1) Elementary, or German (1) Elementary.	4.
Horticulture (1) Elements.	4.	Shopwork (2)	3.	Horticulture (1) Plant Propagation.	4.
Physiology (1) Anatomy.	3.	Physiology (1) Physiology.	3.	Physiology (1) Physiology.	3.
Zoology (4) Economic Entomology.	2.	Zoology (4) Economic Entomology.	2.	Zoology (4) Economic Entomology.	2.
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

THIRD YEAR

REQUIRED

Agriculture (11) Farm Equipment.	4.	Agriculture (12) Soils.	4.	Agriculture (13) Crops.	4.
				Astronomy (3) Meteorology.	2.
				Drawing (16)	3.
French (2) or German (4) General.	4.	French (2) or German (4)	4.	French (2) or German (4)	4.
Geology (2)	5.	Geology (5) General.	3.	Zoology (4) Economic Entomology.	3.
Horticulture (5) Varieties of Fruit.	4.	Horticulture (6) Principles of Fruit Culture.	4.	Horticulture (7) Small Fruits and Spraying.	4.

† Where credit is received for Elementary French or German, French (2) 4 hours or German (4) 4 hours is required.

FOURTH YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Horticulture (8) Elementary Floriculture	2.	Horticulture (9) Commercial Floriculture	2.	Horticulture (10) Home Floriculture.	2.
Horticulture (11) Arboriculture.	2.	Horticulture (12) Forestry and Sylviculture.	2.	Horticulture (13) Landscape Gardening.	2.
History (5) U. S. Political.	4.	History (5) U. S. Political.	4–2.	Economics (2) Political Economy.	4.
		Economics (2) Political Economy.	4–2.		

ELECTIVE

Ten hours a week through the year, including two hours for thesis, chosen from any of the courses given in any College of the University upon which the student is qualified to enter; except in the College of Law.

THESIS

As a requisite for graduation each candidate must present an acceptable thesis embodying the results of a special research. The subject must be announced to the President of the University (dependent upon the written approval of the head of the department in which it lies) not later than the beginning of the second term of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

OUTLINE OF THE COURSE IN DOMESTIC SCIENCE

FIRST YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Agr'l Chemistry (1) Principles.	5.	Agr'l Chemistry (8) Organic.	5.	Agr'l Chemistry (9) Applications.	5.
Botany (6) Physiological.	3.	Botany (7) Physiological and Economic.	5.	Botany (8) Economic Botany. Vegetable Pathology.	5.
Drawing (1)	2.	Drawing (1)	2.	Drawing (1)	2.
Rhetoric (5) English Composition.	2½	Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.
Zoology (1) Invertebrate.	3.	Zoology (1) Invertebrate.	3.	Zoology (1) Invertebrate.	3.
Hygiene and Physical Training.		Hygiene and Physical Training.		Hygiene and Physical Training.	

SECOND YEAR

REQUIRED

Agr'l Chemistry (4) Laboratory.*	5.	Agr'l Chemistry (4) Laboratory.*	5.	Physiology (3) Chemical Physiology.	3.
				Physiology (10)	2.
Domestic Economy (1)	4.	Domestic Economy (2)	4.	Domestic Economy (3)	4.
Drawing (10) Mechanical.	2.	Drawing (15) Architectural.	2.	Drawing (15) House Designing.	2.
†French (1) Elementary, or †German (1) Elementary.	4.	French (1) Elementary, or German (1) Elementary.	4.	French (1) Elementary, or German (1) Elementary.	4.
Physiology (1)	3.	Physiology (1)	3.	Physiology (1)	3.
Hygiene and Physical Training.		Hygiene and Physical Training.		Hygiene and Physical Training.	

THIRD YEAR

REQUIRED

Domestic Economy (4)	4.	Domestic Economy (5)	4.	Domestic Economy (6)	4.
French (2) or German (4)	4.	French (2) or German (4)	4.	French (2) or German (4)	4.
History (5) U. S. Political.	4.	History (5) U. S. Political.	4–2.	Economics (2) Political Economy.	4.
Education (1)	4.	Economics (2) Political Economy.	4–2.	English Literature (3)	4.
		Education (1)	4–2.		
		English Literature (2)	4–2.		

Elective: Two hours a week, through the year.

FOURTH YEAR

REQUIRED

Domestic Economy (7)	4.	Domestic Economy (8)	4.	Domestic Economy (9)	4.
Horticulture (8) Elements of Floriculture.	2.	Horticulture (9) Commercial Floriculture.	2.	Horticulture (10) Home Floriculture.	2.

* Specific laboratory work will be provided for students in this course, where necessary.

† Where credit is received for Elementary French or German, French (2) 4 hours or German (4) 4 hours is required.

ELECTIVE

Ten hours a week through the year chosen from any of the courses given in any college of the University upon which the student is qualified to enter; except in the College of Law.

THESIS

As a requisite for graduation each candidate must present an acceptable thesis embodying the results of a special research. The subject must be announced to the President of the University (dependent upon the written approval of the head of the department in which it lies) not later than the beginning of the second term of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

THE SHORT COURSES

A two–year course in Agriculture and a two–year course in Domestic Economy have been provided for those who have neither the time nor the means to pursue four–year courses. These short courses also enable those who lack the preparation for entering the four–year courses to obtain such preparation. The studies of the first year of the short courses, it will be noticed, nearly prepare the student to enter the first year of the four–year courses. The student having had chemistry in the first year of a short course can finish his preparation for either of the four–year courses during the first year of the latter course, in place of the chemistry required.

At the end of the first year of the Short Course in Agriculture, for example, the student has three strings to his bow. He may finish the second year of the short course by taking the more technical studies from the four–year courses, if lack of time or means demand it; or he may enter either the four–year course in Agriculture or the four–year course in Horticulture and Forestry. The same is practically true of the Short Course in Domestic Economy.

These short courses are not, of course, to be compared in breadth, strength, or thoroughness with the full courses of the University. They are far better preparation for the work to which they lead than no preparation; but all students are urged to take or to continue into the full four–year courses wherever possible.

ADMISSION TO THE SHORT COURSES IN AGRICULTURE AND DOMESTIC ECONOMY AND THE COURSE IN DAIRYING

Applicants must be at least fifteen years of age, and unless over twenty–one years of age must pass an examination in *Arithmetic*, *Geography*, *Grammar* and *United States History*, or bring High School or other certificates for those branches. Applicants who are over twenty–one are admitted without examination.

OUTLINE OF THE SHORT COURSE IN AGRICULTURE

FIRST YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Agr'l Chemistry (1) Principles.	5.	Agr'l Chemistry (8) Organic.	5.	Agr'l Chemistry (9) Applications.	5.
Mathematics (1) Algebra.	5.	Mathematics (3) Geometry.	5.	Botany (1) Elementary.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Geology (1) Physiography.	5.
Drawing (10) Mechanical.	2.	Shopwork (1)	3.	Physiology (2) General.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Not less than fifteen hours per week through the year; chosen from any of the following courses subject to conditions named under "Departments of Instruction."

Agriculture (8) Breeds of Live Stock.	4.	Agriculture (9) Principles of Breeding.	4.	Agriculture (10) Stock Feeding.	4.
Agriculture (11) Farm Equipment.	4.	Agriculture (12) Soils.	4.	Agriculture (13) Crops.	4.
Agriculture (17) Milk Sanitation.	3.				
Botany (6) Physiological.	5.	Agriculture (15) Dairy.	4.	Zoology (7) Entomology.	3.
Horticulture (1) Elements.	4.	Horticulture (1) Greenhouse Construction.	4.	Horticulture (1) Plant Propagation.	4.
		Shopwork (2)	3.		
Veterinary Medicine (28) Anatomy.	5.	Veterinary Medicine (29) General Pathology.	5.	Veterinary Medicine (30) Special Pathology.	5.
Horticulture (5) Varieties of Fruit.	4.	Horticulture (6) Principles of Fruit Culture.	4.	Horticulture (7) Small Fruits and Spraying.	4.
		Physiology (6)	2.		
Cadet Service.		Cadet Service.		Cadet Service.	

COURSE IN DAIRYING

The course in dairying begins each year on the Wednesday following the first day of January, and continues during the entire term. Butter-making, as practiced in the farm dairy and in the creamery, is thoroughly taught. The student performs all necessary operations in the manufacture of butter by these two methods, under the guidance of the instructors. In cheese-making the principles are taught, with elementary practice.

Agriculture (5). Dairy Farming.—Three hours each week. Lectures and recitations on breeds, breeding, feeding, selection and judging of dairy stock, equipment and management of dairy farms.

Agriculture (6). Butter and Cheese-making.—Four half days each week. Laboratory practice in running separator, churning, working butter, making cheese, milk testing, etc.

Agriculture (7). Butter and Cheese-making.—Two hours each week. Lectures and recitations.

Agricultural Chemistry (7). Milk Chemistry and Milk Testing.—Two hours each week. Lectures and laboratory practice.

Physiology (6). Bacteria in their relation to Milk, Butter and Cheese.—Two hours each week. Lectures and laboratory practice.

Veterinary Medicine (17). Diseases of the Cow.—Three hours each week.

Mechanical Engineering (26). Steam Machinery.—One hour each week.

SHORT COURSE IN DOMESTIC SCIENCE

FIRST YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Agr'l Chemistry (1) Principles.	5.	Agr'l Chemistry (8) Organic.	5.	Agr'l Chemistry (9) Applications.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Botany (1) Elementary.	5.
French (1) or German (1)	4.	French (1) or German (1)	4.	French (1) or German (1)	4.
Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.
Hygiene and Physical Training.		Hygiene and Physical Training.		Hygiene and Physical Training.	

SECOND YEAR

REQUIRED

Domestic Economy (1)	4.	Domestic Economy (2)	4.	Domestic Economy (3)	4.
Domestic Economy (4)	4.	Domestic Economy (5)	4.	Domestic Economy (6)	4.
Hygiene and Physical Training.		Hygiene and Physical Training.		Hygiene and Physical Training.	

ELECTIVE

Not less than seven hours per week through the year; chosen from any of the following courses subject to conditions named under "Departments of Instruction."

Botany (6) Physiological.	5.	Botany (7) Physiological and Economic.	5.	Botany (8) Economic Botany. Vegetable Pathology.	5.
Drawing (1)	2.	Drawing (1)	2.	Drawing (1)	2.
Education (1)	4.	Education (1)	4–2.	English Literature (2)	4.
		English Literature (2)	4–2.		
Horticulture (8) General Floriculture.	2.	Horticulture (9) Commercial Floriculture.	2.	Horticulture (10) Home Floriculture.	2.
Zoology (1) Invertebrate.	3.	Zoology (1) Invertebrate.	3.	Zoology (1) Vertebrate.	3.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

FOR ADMISSION TO THE COURSE IN ARTS[1]

The following are the requirements:

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, or equivalents: Shakespeare's *Merchant of Venice, Julius Caesar,* and *Macbeth;* Milton's *Lycidas, Comus, L'Allegro, and Il Penseroso;* Burke's *Conciliation with the Colonies*; Macaulay's *Essays on Milton and Addison*; The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of all of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Taylor's Academic or equivalent.

4. *Botany*—Kellerman's Elementary Botany and Spring Flora or equivalent.

5. *Civil Government*—Fiske or Thorpe preferred.

6. *Geometry, Plane and Solid*—Venable, White, Wentworth or Wells.

7. *Greek*—Grammar (Goodwin's preferred) and Prose Composition; or the first 100 lessons of White's Beginner's Greek Book. Reading: The first three books of Xenophon's *Anabasis.* At least two years should be devoted to this work.

8. *History*—Either Myers's General History (or equivalent); or, if the teacher's training and the school library will warrant, Greek and Roman History on the topical method. A circular concerning the topical method will be sent on application.

9. *Latin*—Pronunciation (the Roman method); Grammar (an exact knowledge of the inflections is essential); Cæsar, the first four books of the *De Bello Gallico;* Cicero, six orations, including *Pro Lege Manilia;* Vergil, the first six books of the *Aeneid,* with Prosody; Prose Composition, Daniell or Collar or Jones or Dodge and Tuttle, entire.

10. *Physics*—Carhart and Chute, Gage, Avery, or Appleton.

For the present, the *Greek* required for admission may be begun at the University, but without University credits.

TO THE LATIN COURSE IN PHILOSOPHY

The requirements are the same as for admission to the Course in Arts; except that instead of *Greek*, the applicant must offer *French* or *German*, as follows:

French.—The requirements under this head are those of the elementary course or grade of preparatory instruction, as formulated in the "Report of the Committee of Twelve of the Modern Language Association of America," and are here stated in the terms of that report.

Applicants should be able to pronounce French accurately, to read at sight easy French prose, to put into French simple English sentences taken from the language of everyday life, or based upon a portion of the French text read, and to answer questions on the rudiments of the grammar as defined below.

Two years should be given to this preparation.

During the first year the work should comprise: (1) Careful drill in pronunciation; (2) the rudiments of grammar, including the inflection of the regular and the more common irregular verbs, the plural of nouns, the inflection of adjectives, participles and pronouns; the use of personal pronouns, common adverbs, prepositions and conjunctions; the order of words in the sentence, and the elementary rules of syntax; (3) abundant easy exercises, designed not only to fix in the memory the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (4) the reading of from 100 to 175 duodecimo pages of graduated texts, with constant practice in translating into French easy variations of the sentences read (the teacher giving the English), and in reproducing from memory sentences previously read; (5) writing French from dictation.

During the second year the work should comprise: (1) The reading of from 250 to 400 pages of easy modern (nineteenth century) prose in the form of stories, plays or historical or biographical sketches; (2) constant practice, as in the previous year, in translating into French easy variations upon the texts read; (3) frequent abstracts, sometimes oral and sometimes written, of portions of the text already read: (4) writing French from dictation; (5) continued drill upon the rudiments of grammar, with constant application in the construction of sentences; (6) mastery of the forms and use of pronouns, pronominal adjectives, of all but the rare irregular verb forms, and of the simpler uses of the conditional and subjunctive.

German —

(a) The Aim of the Instruction.

At the end of the elementary course in German the pupil should be able to read at sight, and to translate, if called upon, by way of proving his ability to read, a passage of very easy dialogue or narrative prose, help being given upon unusual words and constructions; to put into German short English sentences taken from the language of every-day life or based upon the text given for translation, and to answer questions upon the rudiments of grammar as defined below.

(b) The Work to be Done.

During the first year the work should comprise: (1) Careful drill upon pronunciations; (2) the memorizing and frequent repetition of easy colloquial sentences; (3) drill upon the rudiments of grammar, that is, upon the inflection of the articles, of such nouns as belong to the language of every-day life, of adjectives, pronouns, weak verbs, and the more usual strong verbs, also upon the use of the more common prepositions, the simpler uses of the model auxiliaries, and the elementary rules of syntax and word-order; (4) abundant easy exercises

designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (5) the reading of from 75 to 100 pages of graduated texts from a reader, with constant practice in translating into German easy variations upon sentences selected from the reading lesson (the teacher giving the English), and in the reproduction from memory of sentences previously read.

During the second year the work should comprise: (1) The reading of from 150 to 200 pages of literature in the form of easy stories and plays; (2) accompanying practice, as before, in the translation into German of easy variations upon the matter read, and also in the off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; (3) continued drill upon the rudiments of the grammar, directed to the ends of enabling the pupil, first, to use his knowledge with facility in the formation of sentences, and, secondly, to state his knowledge correctly in the technical language of grammar.

Until the year 1902, the *German* or *French* required for admission may be begun at the University, but without University credits. For the year 1902 and thereafter, the full requirements as above stated will be held to.

TO THE MODERN LANGUAGE COURSE IN PHILOSOPHY

The requirements are the same as for admission to the course in Arts; except that instead of *Latin* and *Greek*, the applicant may offer *Latin* and *French*, or *Latin* and *German*, or *French* and *German*, in the amounts specified above.

Until the year 1902, either the *French* or the *German* (but not both), required for admission may be begun at the University, but without University credits. For the year 1902, and thereafter, the full requirements as above stated will be maintained.

TO THE ENGLISH COURSE IN PHILOSOPHY

The requirements are the same as for admission to the Modern Language Course in Philosophy. But in place of one of the foreign languages the applicant may offer the following group:

1. *Chemistry*—Williams or Remsen.
2. *English Literature*—Pancoast's Introduction to English Literature and an acquaintance with representative works in each period; or, *English History*— Montgomery.
3. *Physiology*—Martin (briefer course).

Until the year 1902, one modern language required for admission may be begun at the University, but without University credits. For the year 1902, and thereafter, the full requirements as stated above will be held to.

TO THE COURSE IN COMMERCE AND ADMINISTRATION

The requirements are the same as for admission to the Modern Language Course in Philosophy.

TO THE COURSE IN SCIENCE

The requirements are the same as for admission to the Modern Language Course in Philosophy.

TO GRADUATE WORK

1. The degree of Master of Arts will be conferred upon candidates holding the degree of B. A. or B. Ph. from this University or from other institutions making equivalent requirements for those degrees, upon the satisfactory completion, during not less than one year of residence (devoted exclusively to such work), of an

approved course of study, covering a major subject and an allied minor subject. The major subject (two-thirds) shall be graduate work, taken in one of the departments of this (the Arts, Philosophy and Science) College. The minor subject (one-third) may be in graduate work.

2. The degree of Master of Science will be conferred upon candidates holding the degree of B. Sc. from the General Science Course of this University, or from institutions making equivalent requirements for this degree, and also upon graduates from the College of Engineering of this University, upon the terms specified for the degree of Master of Arts; except that the major subject shall be taken in one of the Departments of Science in this (the Arts, Philosophy and Science) College. The minor subject shall be in an allied Science.

3. The degree of Master of Arts will be conferred upon candidates holding the degree of B. A. or B. Ph. and the degree of Master of Science upon candidates holding the degree of B. Sc. from this University, or from other institutions making equivalent requirements for these degrees, and the degree of Master of Science will be conferred on graduates from the College of Engineering of this University, on the completion, during not less than one year of residence, of a course of study in one or more of the departments of this College, not less than one-third of which course shall be graduate work and not more than two-thirds may be such undergraduate work as is announced to be elective, such course to be subject to the approval of the Executive Committee of the Faculty of this College. But a degree conferred under the provisions of this paragraph shall in no case be counted towards the degree of Doctor of Philosophy, or Doctor of Science.

4. With the consent of the Faculty the work of candidates for Master's degree may be distributed over more than one year.

5. Each candidate for a Master's degree must also prepare and submit a thesis, and, after its acceptance, be examined upon the work assigned him. The regulations as to undergraduate theses apply to theses for Master's degree also.

6. The degree of Ph. D., or of D. Sc., will be conferred upon holders of the appropriate baccalaureate degree from this University, or from other institutions making equivalent requirements for the first degree, upon the satisfactory completion of three years of resident graduate work in the Arts, Philosophy and Science College, including thesis and examinations. Holders of the degree of Master of Arts or Master of Science from this University, under the conditions prescribed in paragraph one or two, or from other institutions making equivalent requirements for these degrees, may receive the Doctor's degree on the satisfactory completion of two years of resident graduate work after obtaining the Master's degree. On approval of the Faculty, the work of the first year, or of the first two years, of the three, may be done at another University which offers equivalent graduate work.

7. Candidates for the degree of Doctor of Science shall take their work wholly in Science.

8. With the consent of the Faculty the work required of candidates for Doctor's degrees may be distributed over more than three years.

COURSE IN ARTS

Degree: Bachelor of Arts

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
Greek (51) Xenophon.	4.	Greek (52) Herodotus, Homer.	4.
Latin (51) Cicero.	4.	Latin (52) Livy, Horace.	4.
Mathematics (67) Algebra, Analytics, Calculus.	3.	Mathematics (68) Trigonometry, Analytics, Calculus.	3.
Rhetoric (51) Composition.	2½	Rhetoric (52) Composition.	2½.
Cadet Service (men).*		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

One of the following (the choice being for the year):

Botany (51) or (57)	3.	Botany (52) or (58)	3.
Botany (55) Systematic and Physiological.	4.	Zoology (64) Comparative.	4.
Chemistry (51) Inorganic.	3.	Chemistry (52) Inorganic.	3.
Physics (51) or (53) Mechanics, Heat, etc.	3.	Physics (52) or (54) Electricity, Magnetism, etc.	3.
Zoology (51) Comparative Zoology.	3.	Zoology (52) Comparative Zoology.	3.

SECOND YEAR

First Semester	Credit hours	Second Semester	Credit hours
Greek (53) Lysias.	4.	Greek (54) Homer, Plato.	4.
†History (55) United States or †Economics (51) Elementary.	4.	Economics (52) Elementary or History (56) United States	4.
Latin (53) Horace, Pliny.	4.	Latin (54) Tacitus, Juvenal.	4.
English Literature (51) Introductory.	4.	Rhetoric (54) Analysis of Prose.	4.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

THIRD YEAR

Philosophy (51) Psychology.	4.	Philosophy (52) Logic and Ethics.	4.
*Major Study	4.	Major Study	4.

ELECTIVE

Eight hours a week through the year—chosen from the courses in this College (See "The Departments," page 119); *except* that, not earlier than the third

* A rule of the Board of Trustees requires each male student (except students in the College of Law) to render two years' cadet service as a condition of graduation. Students physically incapacitated for cadet service will be assigned an equivalent in special gymnasium work. The President has authority to excuse from cadet service under certain conditions.

Young women are required to carry Hygiene and Physical Training in place of cadet service.

year, studies equivalent to five hours a week for one year may be chosen from any course or courses taught in the University; provided that the studies chosen are such as the student is qualified to pursue.

FOURTH YEAR

*Major Study	5.	Major Study	5.
Electives (as in third year)	10.	Electives (as in third year)	10.

THESIS

At the beginning of the Senior year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the beginning of the second semester of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

LATIN COURSE IN PHILOSOPHY

Degree: Bachelor of Philosophy

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
French (51) Elementary, or (55) or German (51) Elementary, or (55)	4.	French (52) Prose and Plays or German (52) Elementary, or (56)	4.
Latin (51) Cato, Cicero.	4.	Latin (52) Livy, Horace.	4.
Mathematics (67) Algebra, Analytics, Calculus.	3.	Mathematics (68) Trigonometry, Analytics, Calculus.	3.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

One of the following (the choice being for the year):

Botany (51) or (57)	3.	Botany (52) or (58)	3.
Botany (55) Systematic and Physiological.	4.	Zoology (64) Comparative.	4.
Chemistry (51) Inorganic.	3.	Chemistry (52) Inorganic.	3.
Physics (51) or (53) Mechanics, Heat, etc.	3.	Physics (52) or (54) Electricity, Magnetism, etc.	3.
Zoology (51) Comparative Zoology.	3.	Zoology (52) Comparative Zoology.	3.

* Major Study. Not later than the beginning of the Third Year, each student shall elect a Major Study in one department or with the consent of the professors in charge, in two allied departments in this college. To the Major Study he shall devote not less than four nor more than ten hours a week during the third year, and not less than five nor more than ten hours the fourth year. With the approval of the proper authority, the Major Study may be entered upon in the second year; an equivalent amount of the required work of that year, not in the line of the Major Study, being postponed to the third year; but the amount so postponed shall not exceed four hours a week. In this case, the elective work of the third year will be reduced by a like amount.

SECOND YEAR.

French (55) Modern Literature or German (55) Literature.	4.	French (56) Modern Literature or German (56) Lyrics.	4.
*History (55) United States or *Economics (51) Elementary.	4.	Economics (52) Elementary or History (56) United States.	4.
Latin (53) Horace, Pliny.	4.	Latin (54) Tacitus, Juvenal.	4.
*English Literature (51) Introductory.	4.	Rhetoric (54) Analysis of Prose.	4.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

THIRD YEAR

Philosophy (51) Psychology.	4.	Philosophy (52) Logic and Ethics.	4.
†Major Study	4.	Major Study	4.

ELECTIVE

Eight hours a week through the year—chosen from the courses in this College, *except* that, not earlier than the third year, studies equivalent to five hours a week for one year may be chosen from any course or courses taught in the University; provided that the studies chosen are such as the student is qualified to pursue.

FOURTH YEAR

†Major Study	5.	†Major Study	5.
Electives (as in third years)	10.	Electives (as in third year)	10.

At the beginning of the Senior year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the fifteenth day of December of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

No one will be admitted to candidacy for a degree later than the first day of October of his last year.

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* The subject not taken the first semester, to be taken the second semester.

† Major Study. Not later than the beginning of the Third Year, each student shall elect a Major Study in one department or with the consent of the professors in charge, in two allied departments in this college. To the Major Study he shall devote not less than four nor more than ten hours a week during the third year, and not less than five nor more than ten hours the fourth year. With the approval of the proper authority, the Major Study may be entered upon in the second year; an equivalent amount of the required work of that year, not in the line of the Major Study, being postponed to the third year; but the amount so postponed shall not exceed four hours a week. In this case, the elective work of the third year will be reduced by a like amount.

MODERN LANGUAGE COURSE IN PHILOSOPHY

Degree: Bachelor of Philosophy

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
French (51) or (55)	4.	French (52) or (56)	4.
German (51) or (55)	4.	German (52) or (56)	4.
Mathematics (67) Algebra, Analytics, Calculus.	3.	Mathematics (68) Trigonometry, Analytics, Calculus.	3.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Cadet Service (men).		*Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

One of the following (the choice being for the year):

Botany (51) or (57)	3.	Botany (52) or (58)	3.
Botany (55) Systematic and Physiological.	4.	Zoology (64) Comparative.	4.
Chemistry (51) Inorganic.	3.	Chemistry (52) Inorganic.	3.
Physics (51) or (53) Mechanics, Heat, etc.	3.	Physics (52) or (54) Electricity, Magnetism, etc.	3.
Zoology (51) Comparative Zoology.	3.	Zoology (52). Comparative.	

SECOND YEAR.

French	4.	French	4.
German	4.	German	4.
*History (55) United States or *Economics (51) Elementary.	4.	Economics (52) Elementary or History (56) United States.	4.
Rhetoric (53) Analysis of Prose.	4.	English Literature (52). Introductory.	
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

THIRD YEAR.

Philosophy (51) Psychology.	4.	Philosophy (52) Logic and Ethics.	4.
†Major Study	4.	†Major Study	4.

ELECTIVE

Eight hours a week through the year—chosen from the courses in this College, *except* that, not earlier than the third year, studies equivalent to five hours a week for one year may be chosen from any course or courses taught in the University; provided that the studies chosen are such as the student is qualified to pursue.

* The subject not taken the first semester, to be taken the second semester.

† Major Study. Not later than the beginning of the Third Year, each student shall elect a Major Study in one department or with the consent of the professors in charge, in two allied departments in this college. To the Major Study he shall devote not less than four nor more than ten hours a week during the third year, and not less than five nor more than ten hours the fourth year. With the approval of the proper authority, the Major Study may be entered upon in the second year; an equivalent amount of the required work of that year, not in the line of the Major Study, being postponed to the third year; but the amount so postponed shall not exceed four hours a week. In this case, the elective work of the third year will be reduced by a like amount.

FOURTH YEAR.

First Semester	Credit hours	Second Semester	Credit hours
†Major Study	5.	†Major Study	5.
Electives (as in third year)	10.	Electives (as in third year)	10.

THESIS

At the beginning of the Senior year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the fifteenth day of December of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

No one will be admitted to candidacy for a degree later than the first day of October of his last year.

ENGLISH COURSE IN PHILOSOPHY

Degree: Bachelor of Philosophy

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
French (51) Elementary or German (51) Elementary.	4.	French (52) Prose and Plays or German (52) Elementary.	4.
History (151) European.	3.	History (152) European.	3.
Mathematics (67) Algebra, Analytics, Calculus.	3.	Mathematics (68) Trigonometry, Analytics, Calculus.	3.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Rhetoric and English Language (69) History of English.	2.	Rhetoric and English Language (70) Development of Prose.	2.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

One of the following (the choice being for the year):

Botany (51) or (57)	3.	Botany (52) or (58)	3.
Botany (55) Systematic and Physiological.	4.	Zoology (64) Comparative.	4.
Chemistry (51) Inorganic.	3.	Chemistry (52) Inorganic.	3.
Physics (51) or (53) Mechanics, Heat, etc.	3.	Physics (52) or (54) Electricity, Magnetism, etc.	3.
Zoology (51) Comparative.	3.	Zoology (52) Comparative.	3.

* Major Study. Not later than the beginning of the Third Year, each student shall elect a Major Study in one department or with the consent of the professors in charge, in two allied departments in this college. To the Major Study he shall devote not less than four nor more than ten hours a week during the third year, and not less than five nor more than ten hours the fourth year. With the approval of the proper authority, the Major Study may be entered upon in the second year; an equivalent amount of the required work of that year, not in the line of the Major Study, being postponed to the third year; but the amount so postponed shall not exceed four hours a week. In this case, the elective work of the third year will be reduced by a like amount.

SECOND YEAR.

First Semester	Credit hours	Second Semester	Credit hours
French (55) Modern Literature or German (55) Literature.	4.	French (56) Modern Literature or German (56) Lyrics.	4.
*History (55) United States or *Economics (51) Elementary.	4.	Economics (52) Elementary or History (56) United States.	4.
Philosophy (53)	3.	Philosophy (54)	3.
Rhetoric (53) Analysis of Prose.	4.	English Literature (52) Introductory.	4.
Rhetoric and English Language (71) Old English.	2.	Rhetoric and English Language (72) Old English.	2.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

THIRD YEAR.

Philosophy (55)	3.	Philosophy (56)	3.
†Major Study	4.	Major Study	4.

ELECTIVE

Eight hours a week through the year—chosen from the courses in this College, *except* that, not earlier than the third year, studies equivalent to five hours a week for one year may be chosen from any course or courses taught in the University; provided that the studies chosen are such as the student is qualified to pursue.

FOURTH YEAR.

Major Study	5.	Major Study	5.
Electives (as in third year)	10.	Electives (as in third year)	10.

THESIS

At the beginning of the Senior year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the fifteenth day of December of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

No one will be admitted to candidacy for a degree later than the first day of October of his last year.

* The subject not taken the first semester, to be taken the second semester.

COURSE IN COMMERCE AND ADMINISTRATION

Degree: Bachelor of Philosophy

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
French (51) Elementary.	4.	French (52) Prose and plays.	4.
German (51) Elementary.	4.	German (52) Elementary.	4.
History (151) European.	3.	History (152) European.	3.
Mathematics (67) Algebra, Analytics, Calculus.	3.	Mathematics (68) Trigonometry, Analytics, Calculus.	3.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

SECOND YEAR.

French (55) Modern Literature or German (55) Literature.	4.	French (56) Modern Literature or German (56) Lyrics.	4.
*History (55) United States or *Economics (51) Elementary.	4.	Economics (52) Elementary or History (56) United States.	4.
History (153) England.	3.	History (154) England.	3.
Rhetoric (5) Analysis of Prose.	4.	English Literature (52) Introductory.	4.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

One of the following (the choice being for the year):

Botany (51) or (57)	3.	Botany (52) or (58)	3.
General Chemistry (51) Inorganic.	3.	General Chemistry (52) Inorganic.	3.
Physics (51) or (53) Mechanics, Heat, etc.	3.	Physics (52) or (54) Electricity, Magnetism, etc.	3.
Zoology (51) Comparative.		Zoology (52) Comparative.	3.

THIRD YEAR.

†Elementary Law	6.	†Contracts	4.
Philosophy (51)	4.	Philosophy (52)	4.
‡Major Study	4.	‡Major Study	4.

ELECTIVE

From the courses mentioned in the departments below, selection may be made to make up the required number of hours. Not less than sixteen nor more than

* The subject not taken the first semester, to be taken the second semester.

† In place of Elementary Law six hours; Commercial Law four hours and Corporations (Private and Municipal) two hours may be substituted. Also in place of Contracts, four hours, any two of the following may be substituted; Corporations (Private), Insurance, Agency, Sales, Mortgages.

‡ See note page 79.

eighteen hours a week are permitted and no substitutions or options further than those indicated below.

First Semester	Credit hours	Second Semester	Credit hours
Economics	2 or 3.	Economics	2 or 3.
German	2 or 3.	German	2 or 3.
History	2 or 3.	History	2 or 3.
Political Science	2 or 3.	Political Science	2 or 3.
Rhetoric (57)	3.	Rhetoric (58)	3.
Romance Language	2 or 3.	Romance Language	2 or 3.

FOURTH YEAR.

†Major Study	5.	†Major Study	5.
Electives (as in third year)	10.	Electives (as in third year)	10.

THESIS

At the beginning of the Senior year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the fifteenth day of December of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

No one will be admitted to candidacy for a degree later than the first day of October of his last year.

COURSE IN GENERAL SCIENCE

Degree: Bachelor of Science

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
Botany (51) Elementary or Zoology (51) Comparative.	3.	Botany (52) Morphology and Classification or Zoology (52) Comparative.	3.
French (51) Elementary or German (51) Elementary.	4.	French (52) Prose and Plays or German (52) Elementary.	4.
Chemistry (51) Inorganic.	3.	Chemistry (52) Inorganic.	3.
*Mathematics (67), (65) Algebra, Analytics, Calculus or Mathematics (55), (57) Trigonometry and Algebra.	4. or 5.	*Mathematics (68), (66) Trigonometry, Analytics, Calculus. or Mathematics (56), (58) Algebra and Analytics.	4. or 5.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

† Major Study. Not later than the beginning of the Third Year, each student shall elect a Major Study in one department or with the consent of the professors in charge, in two allied departments in this college. To the Major Study he shall devote not less than four nor more than ten hours a week during the third year, and not less than five nor more than ten hours the fourth year. With the approval of the proper authority, the Major Study may be entered upon in the second year; an equivalent amount of the required work of that year, not in the line of the Major Study, being postponed to the third year; but the amount so postponed shall not exceed four hours a week. In this case, the elective work of the third year will be reduced by a like amount.

* Students taking both Botany 51 and 52 and Zoology 51 and 52 will take Mathematics 67 and 68 as the required Freshman Mathematics.

SECOND YEAR

First Semester	Credit hours	Second Semester	Credit hours
Economics (51) Political Economy.	4.	Rhetoric (54) Analysis of Prose.	4.
‡French or ‡German	4.	French or German	4.
Physics (51) Mechanics, Heat, etc.	3.	Physics (52) Electricity, Magnetism, etc.	3.
Physiology (51) Human Anatomy.	3.	Physiology (52) Physiology.	3.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

Together with one of the following subjects, to be continued through the year:

(a) Botany (57), (58), each three hours credit or (59), (60), each five hours' credit for a semester. (b) General Chemistry (53), (54), each five hours' credit. (c) Mathematics (59), (61), (60), (62), each five hours' credit for a semester. (d) Zoology (53), (54), each three hours' credit, or (55), (56), each five hours' credit.

THIRD YEAR

**Geology (61) and	3.	Geology (62) and	3.
Astronomy (61) General	2.	**Astronomy (62) General	2.
or		or	
‡French or German**	4.	**Astronomy (54) Mathematical.	5.
Philosophy (53)	3.	Philosophy (54)	3.
*Major Study	4.	Major Study	4.

Elective: Four hours a week through the year—chosen from the courses in this College, *except* that not earlier than the third year:

First: Studies equivalent to five hours a week for one year may be chosen from any courses taught in the University; provided, that the studies chosen are such as the student is qualified to pursue.

Second: Additional studies equivalent to five hours a week for one year may be chosen in the College of Engineering.

FOURTH YEAR.

Major Study (as in third year)	5.	Major Study (as in third year)	5.
Electives (as in third year)	10.	Electives (as in third year)	10.

THESIS

As a requisite for graduation each student must present an acceptable thesis embodying the results of a special research. The line of research must lie within

‡ It is desired that the student on completing this course, shall possess a good reading knowledge of both French and German. Therefore, the student entering on both French and German will take both languages in the University, each for one year. He who enters on one Modern Language will continue that language one year in case he cannot read easy prose at sight and take the other language for one year. In case a reading knowledge of one Modern Language is possessed, the student will take the other language two years. The third year of Language in the case of students making the Mathematics a specialty will be that language of which the student has the less knowledge.

** Students who elect Mathematics as their Major Study shall, in the Third Year, take French or German four hours the first semester and Astronomy five hours the second semester.

* Major Study. Not later than the beginning of the Third Year each student in this course shall elect a Major Study in Mathematics or in a Science in which Laboratory instruction is given. This Major Study shall be in one department, or with the consent of the professors in charge in two allied departments in this college. To the Major Study the student shall devote not less than five not more than ten hours a week during the Fourth Year.

the field of the major study, and is subject to the approval of the professor or professors having the major study in charge; and the student shall enter on this work not later than the beginning of the Senior year, and shall devote to it not less than two hours a week, or its equivalent, for one year, independently of his other work. The subject of thesis, together with a written approval of it by the professor or professors directing the investigation, must be submitted to the President of the University, not later than the beginning of the second semester of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day. In case two or more students are pursuing the same major study, a joint research and thesis may be made.

THE SPECIAL COURSES

COURSE PREPARATORY TO LAW AND TO JOURNALISM

FOR ADMISSION

The requirements for admission to any of the four year courses in the College of Arts, Philosophy and Science; except that the applicant must not be less than eighteen years of age.

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
English Literature (51) Introductory.	4.	Economics (52) Elementary.	4.
French (51) Elementary or German (51) Elementary.	4.	French (52) Prose and Plays or German (52) Prose and Plays.	4.
History (151) European.	3.	History (152) European.	3.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Science, Elective	3.	Science, Elective	3.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

SECOND YEAR

Economics (55) Practical Problems.	2.	Economics (56) Industrial Reforms.	2.
English Literature Elective.	2 or 3.	English Literature Elective.	2 or 3.
European History (153) England.	3.	European History (154) England.	3.
American History (55) United States.	4.	Rhetoric (54) Analysis and Prose.	4.
Philosophy (53) Psychology.	3.	Philosophy (54) Logic.	3.
Rhetoric (55) Newspaper work.	1.	Rhetoric (56) Newspaper work.	1.
Rhetoric (69) History of English.	2.	Rhetoric (70) Development of Prose.	2.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

Note — A student desiring to continue French or German may substitute French (55 and 56), or German (55 and 56), for four hours of the studies of the second year. The studies thus deferred must be taken in the third year.

THIRD YEAR.

Not less than sixteen nor more than seventeen hours a week, including studies deferred from the second year; selections to be made from the following, subject to the conditions named in the "Departments of Instruction." In view of the fact that this is a special course for special purposes, no substitutions or options further than those indicated below, will be permitted.

First Semester	Credit hours	Second Semester	Credit hours
American History (63), (65)	2.	American History (64), (66)	3.
Economics (53), (57), (59)	2.	Economics (54), (58), (60)	2.
English Literature	2 or 3.	English Literature	2 or 3.
European History (155), (157), (161)	2.	European History (156), (158), (162)	2.
Education (57)	2.	Education (54)	2.
Philosophy (55) Ethics.	3.	Philosophy (56) Modern.	3.
Political Science (51), (55)	2.	Political Science (52), (56)	2.
Political Science (53)	3.	Political Science (54)	3.
Rhetoric (57), (69), (75)	3.	Rhetoric (58), (70), (76)	3.
Rhetoric (59)	2.	Rhetoric (60)	2.

COURSE PREPARATORY TO THE STUDY OF MEDICINE

The three-year course preparatory to the study of Medicine has been discontinued owing to the fact that the completion of this course would not, under the present requirements of the Association of Medical Colleges, enable the student to gain credit for a year's time in the medical course. While it is deemed wiser for the present not to offer a special four-year course leading to a degree, it is desired to point out that a student having a medical career in view when entering here, or determining on such a career within the first year or two of his university course, may make such elections in any of the general courses as to gain a full year's credit, both in work and time allowance in a medical college.

While studies differ in different medical curricula it may be noted that Chemistry, Zoology, Comparative Anatomy, Embryology, Histology, Physiology, Bacteriology and Materia Medica, as taught here will be accepted in the medical schools and election of these in their proper sequence will enable the student to qualify himself very thoroughly for his medical course.

Students having medicine in view will do well to consult with the professors having these studies in charge, with reference to the best sequence of election and those having a particular medical college in view can make their selections with special reference to its requirements. Students already entered in the Course Preparatory to the Study of Medicine may complete the work as arranged at the time of their entrance.

THE COLLEGE OF ENGINEERING

FOR ADMISSION TO THE FOUR-YEAR COURSES, AND TO THE COURSE IN ARCHITECTURE

The following are the requirements:

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, or equivalents: Shakespeare's *Merchant of Venice, Julius Caesar*, and *Macbeth;* Milton's *Lycidas, Comus, L'Allegro, and Il Penseroso;* Burke's *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison;* The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of all of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Taylor's Academic or equivalent.
4. *Civil Government*—Fiske or Thorpe preferred.
5. *Geometry, Plane and Solid*—Venable, Wentworth, White, or Wells.
6. *History*—Myers's General History.
7. *Latin*—Pronunciation (the Roman method); Grammar (an exact knowledge of the inflections is essential), Cæsar, the first four books of the *De Bello Gallico.*

Or *French*—The whole subject of French Grammar. Applicants will be expected to read at sight easy French and to translate correctly into French simple English sentences. Two years ought to be given to this study, the first year being spent mainly on the Grammar with easy reading; the second devoted to reading good modern French, with grammatical analysis and exercises in writing. The text read should be chiefly narrative and conversational prose; one or more prose comedies of the nineteenth (*not* the seventeenth) century should be included.

Or *German*—Joynes-Meissner's or Thomas's Grammar is recommended. The essentials in these grammars should have been mastered thoroughly, *i. e.*, declen-

sions of nouns and adjectives, pronouns, comparison of adjectives, prepositions, regular and irregular verbs and essentials of syntax.

The following books or their equivalents must have been read (not less than 600 pages): Joynes's or Whitney's Reader, Hillern's Höher als die Kirche, Riehl's Der Fluch der Schönheit, Freytag's Die Verlorne Handschrift, Gerstäcker Irrfahrten.

Until the year 1902, the *German* or *French* required for admission may be begun at the University, but without University credits. For the year 1902 and thereafter, the full requirements as above stated will be held to.

8. *Physics*—Gage, Carhart and Chute, Avery or Appleton, complete.

Note — An applicant for admission who may be somewhat in arrears in any given subject, will find opportunity to make up this work in the Columbus High Schools, which are fully accredited by the University.

No student will be admitted to the College of Engineering who is in arrears more than fifteen hours, of which not more than five hours may be in Mathematics.

COURSE IN CIVIL ENGINEERING

This course is arranged for students expecting to become surveyors or civil engineers. The plan of the course is to give (1) a thorough training in mathematics and mechanics, (2) the general principles underlying all branches of civil engineering, (3) the application of the general principles to the several branches of civil engineering. The subjects of land, railroad and topographical surveying are important features, and students can at once begin practical work. In the engineering work special attention is given to iron and steel bridge work, masonry construction and cement testing, road and railroad building and maintenance, water supply and the subject of the collection and disposal of sewage.

FIRST YEAR

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
French (1) or German (1)	4.	French (1) or German (1)	4.	French (1) or German (1)	4.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Metallurgy (2) Mineralogy.	3.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service.		Cadet Service.			

SECOND YEAR

Civil Engineering (1) Surveying.	6.	Civil Engineering (4) C. E. Drawing.	4.	Civil Engineering (2) Surveying.	6.
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geometry.	5.	Drawing (3) Shades, Shadows & Per.	3.
Mathematics (18) Space Analysis.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics and Heat.	3.	Physics (2) Electricity & Magnetism.	3.	Physics (2) Light and Sound.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

SUMMER COURSE

Civil Engineering (22). Four weeks — six days per week. Field work in land and railroad surveying.

THIRD YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Civil Engineering (3) Topog. Surveying.	4.	Civil Engineering (24) C. E. Drawing.	5.	Astronomy (6) Mathematical.	4.
Civil Engineering (16) Roads and Streets.	5.	Civil Engineering (6) Stereotomy.	4.	Civil Engineering (7) Bridge Stresses.	5.
Astronomy (4) Mathematical.	3.	Astronomy (5) Mathematical.	3.	Drawing (7) Photography.	2.
Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (7) Strength Materials.	5.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.

SUMMER COURSE

Civil Engineering (23). Four weeks — six days per week. Field work in railroad and topographical surveying.

FOURTH YEAR

Civil Engineering (8) Bridge Designing.	5.	Civil Engineering (17) Railways.	5.	Civil Engineering (18) Water Supply.	5.
Civil Engineering (15) Masonry.	5.	Civil Engineering (14) Cement Testing.	2.	Civil Engineering (10) Sanitary Engineering.	5.
Elec. Engineering. Lectures (6)	2.	Elec. Engineering. Lectures (6)	2.		
		Laboratory (7)	2.		
		Mech. Engineering (17) Laboratory.	3.	Mech. Engineering (35) Laboratory.	5.
Geology (5) General.	5.	Geology (6) Economic.	3.		

* VOLUNTARY

* French (3), two hours; or German (2), two hours; or Rhetoric (4), two hours; each for the year.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of this study must lie within the field of Civil Engineering. The subject must be announced to the President of the University (dependent upon the approval of the head of the Department) not later than the beginning of the second term of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN MINE ENGINEERING

This Course is arranged for students intending to become mining engineers and surveyors, metallurgical or technical chemists. The plan of work, therefore, while keeping mathematics, drawing and engineering prominent, also provides extended work in applied chemistry, chemical analysis, assaying, mineralogy, geology, and surveying with especial application to mines and underground work, while the treatment of ores, both mechanical in ore dressing and chemical in metallurgy, forms an important feature.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
French (1) or German (1)	4.	French (1) or German (1)	4.	French (1) or German (1)	4.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Metallurgy (2) Mineralogy.	3.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Drawing (3) Projections.	3.	Drawing (3) Descriptive Geometry.	3.	Drawing (3) Shades & Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Metallurgy (5) Laboratory.	5.	Metallurgy (5) Laboratory.	5.	Metallurgy (5) Laboratory.	5.
Physics (2) Mechanics and Heat.	3.	Physics (2) Electricity & Magnetism.	3.	Physics (2) Light and Sound.	3.
Shopwork (7) Woodwork.	2.	Shopwork (11) Forging.	2.	Shopwork (4) Chipping and Filing.	2.
Cadet Service.		Cadet Service.			

VOLUNTARY

French (3)	2.	or German (2) Each for the year.	2.	or Rhetoric (4)	2.

THIRD YEAR

Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (7) Strength Materials.	5.
Metallurgy (4) Fuels and Iron.	5.	Metallurgy (4) Steel, Copper, Gold, etc.	5.	Civil Engineering (19) Truss Stresses.	5.
Mine Engineering (4) Mine Surveying.	5.	Metallurgy (6) Assaying.	5.	Metallurgy (3) Deter. Mineralogy.	5.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.

FOURTH YEAR

Elec. Engineering. Lectures (6)	2.	Elec. Engineering. Lectures (6)	2.	Mech. Engineering (3) Plans and Specifications.	5.
Laboratory (7)	2.	Laboratory (7)	2.		
Geology (5) General.	5.	Geology (6) Economic.	3.	Mine Engineering (6) Plans and Specifications.	5.
Mine Engineering (5) Mine Engineering.	5.	Metallurgy (7) Metal. Construction.	3.	Mine Engineering (5) Mine Engineering.	5.
Metallurgy (8) Ore Dressing.	2.	Mine Engineering (5) Mine Engineering.	5.	Drawing (7) Photography.	2.
		Geology (7) Petrography.	2.		

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of such study must lie within the field of Metallurgy or of Mine Engineering. The subject must be

announced to the President of the University (dependent upon the written approval of the head of the department) not later than the beginning of the second term of the fourth year; and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN MECHANICAL ENGINEERING

This Course has for its object the qualifying of men for the mechanical engineering profession. It aims to embrace preparation for such lines of pursuit as the successful management of machinery in manufacturing establishments; the superintendence of construction; the designing and laying out of machinery plants for mills and factories; the construction of machines for particular purposes, and the designing and drawing of the same, the making of calculations respecting strength, shocks, proportion, endurance, and suitability of material for specific purposes.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
French (1) or German (1)	4.	French (1) or German (1)	4.	French (1) or German (1)	4.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Shopwork (7) Carpentry and Pattern Making.	4.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Mechanics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Drawing (3) Projections.	3.	Drawing (3) Descr. Geometry.	3.	Drawing (3) Shades & Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics and Heat.	3.	Physics (2) Electricity & Magnetism.	3.	Physics (2) Sound and Light.	3.
Shopwork (11) Forging.	3.	Physics (7) Laboratory.	2.	Physics (7) Laboratory.	3.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.
Shopwork (3) Foundry.	2.	Shopwork (4) Chipping and Filing.	3.	Shopwork (13) Machine Work.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

VOLUNTARY

French (3)	2.	or German (2) Each for the year.	2.	or Rhetoric (4)	2.

THIRD YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (5) Technical.	3.	Mech. Engineering (6) Mechanics.	5.	Drawing (7) Photography.	2.
Mathematics (11) Differential Equations.	1.	Mech. Engineering (22) Timber and Masonry.	3.	Civil Engineering (19) Truss Stresses.	5.
Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (3) Mechanism.	5.	Mech. Engineering (7) Strength Materials.	5.
Metallurgy (4) Fuels and Iron.	5.	Metallurgy (4) Steel.	2.		
Shopwork (14) Machine Work.	3.	Shopwork (15) Advanced Machine Work.	4.	Mech. Engineering (3) Mechanism.	2.
Mech. Engineering (12) Laboratory.	2.			Mech. Engineering (32) Power Plants.	5.

FOURTH YEAR

Elec. Engineering.		Elec. Engineering.		Industrial Arts (5) Shop Appliances.	3.
Lectures (6)	2.	Lectures (6)	2.		
Laboratory (7)	2.	Laboratory (7)	2.		
Mech. Engineering (27) Laboratory.	5.			Mech. Engineering (19) Machine Design.	5.
Mech. Engineering (33) Engines & Boilers.	5.	Mech. Engineering (34) Thermodynamics.	5.	Mech. Engineering (15) Laboratory.	3.
		Mech. Engineering (14) Laboratory.	4.	Mech. Engineering (31) Hydraulic Mach.	3.
Mech. Engineering (18) Mach. Design.	5.	Mech. Engineering (18) Mach. Design.	5.	Mech. Engineering (21) Thesis Work.	5.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of such study must lie within the field of Mechanical Engineering. The subject must be announced to the President of the University (dependent upon the written approval of the head of the department) not later than the beginning of the second term of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN ELECTRICAL ENGINEERING

The object of this Course is to prepare students for the various pursuits in which the applications of electricity are prominent. Physics, especially theoretical and applied electricity, and mechanical engineering are naturally the leading subjects of the Course. General theory is treated in ample breadth, and is tested by experiments in well equipped laboratories. The laboratories are so conducted as to afford the student a degree of facility in the use of instruments and machinery only acquired by continued practice.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
French (1) or German (1)	4.	French (1) or German (1)	4.	French (1) or German (1)	4.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Shopwork (7) Carpentry & Pattern Making.	4.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geometry.	3.	Drawing (3) Shade & Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics, Heat.	3.	Physics (2) Electricity, Magnetism.	3.	Physics (2) Light, Sound.	3.
Physics (3) Problems.	2.	Physics (3) Problems.	2.	Physics (3) Problems.	2.
Shopwork (11) Forging.	2.			Physics (5) Laboratory.	4.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.
Shopwork (4) Chipping and Filing.	2.	Shopwork (13) Machine Work.	3.		
Cadet Service.		Cadet Service.		Cadet Service.	
		VOLUNTARY			
French (3)	2.	or German (2) Each for the year.	2.	or Rhetoric (4)	2.

THIRD YEAR

Drawing (5) Technical.	3.	Mech. Engineering (3) Mechanism.	5.	Industrial Arts (7) Machine Design.	3.
Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (28) Laboratory.	2.
Physics (6) Laboratory.	3.	Physics (6) Laboratory.	5.	Mech. Engineering (7) Strength Materials.	5.
Physics (4) Electricity & Magnetism.	3.	Elec. Engineering (8) D. C. Machine.	4.	Mech. Engineering (32) Power Plants.	5.
Shopwork (14) Machine Work.	3.			Elec. Engineering (9) Laboratory.	4.

FOURTH YEAR

Elec. Engineering (10) Alt. Current. Mach.	3.	Elec. Engineering (10) Alt. Current Mach.	3.	Elec. Engineering (13) Applications.	5.
Elec. Engineering (11) Laboratory.	3.	Elec. Engineering (14) Designing.	4.	Elec. Engineering (14) Designing.	4.
Mech. Engineering (4) Laboratory.	5.	Elec. Engineering (11) Laboratory.	3.	Elec. Engineering (4) Laboratory and Thesis.	5.
Mech. Engineering (8) Engines & Boilers.	5.	Elec. Engineering (9) Transmission.	5.		
*Elective	3–5.	*Elective	3–5.	*Elective	3–5.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the result of a special study. The subject of such study must lie within the field of Electrical Engineering. The subject must be announced to the President of the University (dependent upon the written approval of the head of the Department) not later than the beginning of the second term of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN CERAMICS

This course is designed to create a class of engineers who shall be fitted to render to the Clay, Glass and Cement Industries the same kind of services which

* Subject to the approval of the Professor of Electrical Engineering.

have long been rendered to Mining and Metallurgical Industries by graduates of Schools of Mines.

The problems of the Ceramic Industries are not unlike those of the Mining Industries, either in kind or in adaptation to methods of technical control; but the information and scientific equipment necessary to solve these problems successfully are peculiar to those industries alone, and in the past have received little or no attention from technical schools in this country.

This course is offered with the hope of filling this long standing gap in the scheme of engineering education in this country. It is essentially an Engineering Course, following closely the lines of the other engineering courses, up to the end of the second year. In the last two years, the training specializes along the lines of Ceramic and of the application of Chemistry to this subject.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Shopwork (7) Carpentering & Pattern Making.	4.
German (1) or (4)	4.	German (1) or (4)	4.	German (1) or French (1)	4.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Ceramics (1) Laboratory.	5.	Ceramics (2) Laboratory.	5.	Ceramics (3) Laboratory.	5.
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geometry.	3.	Drawing (3) Shades, Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics and Heat.	3.	Physics (2) Electricity & Magnetism.	3.	Physics (2) Light and Sound.	3.
Physics (3) Problems.	2.	Physics (3) Problems.	2.	Physics (3) Problems.	2.
Cadet Service.		Cadet Service.		Cadet Service.	
		VOLUNTARY			
French (3)	2.	or German (2) Each through the year.	2.	or Rhetoric (4)	2.

THIRD YEAR

Ceramics (4) General Principles.	4.	Ceramics (5) Bricks.	5.	Ceramics (6) Pottery.	5.
Mine Engineering (4) Mine Surveying.	5.	Ceramics (7) Advanced Chemical Laboratory Work.	5.	Metallurgy (2) Minerology.	3.
Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (7) Strength Materials.	5.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.
				Shopwork (11) Forging.	3.

FOURTH YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Ceramics (9) Manufacture of Bodies.	5.	Ceramics (10) Glasses and Glazes.	5.	Ceramics (11) Enamels and Colors.	5.
Shopwork (4) Chipping and Filing.	3.	Ceramics (12) Cement.	5.	Ceramics (15) Thesis Work.	5.
Geology (5) General.	5.	Ceramics (17) Ceramic Construction.	4.	Ceramics (14) Reports.	5.
Metallurgy (4) Fuels and Iron.	5.	Geology (6) Economic.	3.	Drawing (7) Photography.	2.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of this study must lie within the field of Ceramic Engineering. The subject must be announced to the President of the University (dependent upon the approval of the head of the Department), not later than the beginning of the second term of the fourth year; and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN INDUSTRIAL ARTS

This course is designed to furnish a strong basis for those wishing to become teachers of Manual Training, and for those intending to enter the various branches of manufacture and industry, not as engineers, but as practical managers, superintendents or business men. The required part of the course combines with a general science training a large amount of drawing and shop work, in which the underlying principles and methods employed in various branches of industry are dwelt on. Large liberty of election of studies is allowed the student. His election, properly exercised, together with the required work will equip the student for a wide range of occupations along the lines stated. The aim of the course is educational as well as professional, the training of the mind and hand together.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Chemistry (2) Qualitative Analysis.	5.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
German (1) Cadet Service.	4.	German (1) Cadet Service.	4.	German (1) Cadet Service.	4.

SECOND YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	3.	Drawing (3) Shades, Shadows.	3.
Physics (2) Mechanics, Heat.	3.	Physics (2) Electricity, Magnetism.	3.	Physics (2) Light, Sound.	3.
Physics (3) Problems.	2.	Physics (3) Problems.	2.	Physics (3) Problems.	2.
Shopwork (7) Woodwork.	3.	Shopwork (9) Adv. Pattern Making.	3.	Shopwork (8) Cabinet Work.	3.
Shopwork (3) Foundry.	3.	Shopwork (11) Forging.	3.	Shopwork (12) Adv. Forging.	3.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.
Economics (51) Elementary.	4.	Economics (51 and 56).		Economics (56) Ind. and Soc. Ref.	2.
Military Drill.		Military Drill.		Military Drill.	

THIRD YEAR

Drawing (5) Technical.	3.	Industrial Arts (2) Designing.	3.	Industrial Arts (2) Designing.	3.
Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.
Shopwork (4) Chipping and Filing.	3.	Shopwork (13) Machine Work.	3.	Shopwork (14) Machine Work.	3.
Metallurgy (4) Fuels and Iron.	5.	Metallurgy (4) Steel.	2.	Civil Engineering (21) Surveying.	3.
Economics (65) Commercial Geog.	2.	Economics (65).		Economics (58 or 66)	2.
Economics (55 or 57)	2.	History (56).		History (56) U. S. Political.	4.
		Economics (55 or 57).			
		Economics (58 or 66).			
		Mech. Engineering (22) Timber and Masonry.	3.		

FOURTH YEAR

Shopwork (15) Adv. Mach. Work.	3.	Shopwork (16) Adv. Mach. Work.	3.	Shopwork (17) Adv. Mach. Work.	3.
Political Science (53) Polit. Inst. of U. S.	3.	Political Science (53). Polit Inst. of U. S.			
Elec. Engineering (6) Lectures.	2.	Elec. Engineering (6) Lectures.	2.	Mech. Engineering (32) Power Plants.	5.
Elec. Engineering (7) Laboratory.	2.	Elec. Engineering (7) Laboratory.	2.		
Industrial Arts (3) Shop Equipment.	3.	Industrial Arts (3) Shop Appliances.	3.	Industrial Arts (3) Shop Management.	3.
Industrial Arts (4) Adv. Designing.	3.	Industrial Arts (4) Adv. Designing.	3.	Industrial Arts (4) Adv. Designing.	3.
Mech. Engineering (28) Laboratory.	2.	Mech. Engineering (29) Laboratory.	2.	Mech. Engineering (30) Laboratory.	2.
		Thesis.		Thesis	3.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis embodying the results of a special study. The subject of such study must lie within the field of Industrial Arts. The subject must be announced to the President of the University (dependent upon the written approval of the head of the Department), not later than the beginning of the second term of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN CHEMISTRY

The object of this Course is to prepare students for work in Industrial Chemistry or Metallurgical Chemistry, according to electives chosen. With proper electives it will also be found a desirable course for students expecting to become general analytical chemists.

The electives are subject to the approval of the head of the department of Chemistry, or of Metallurgy and Mineralogy for students in Metallurgical Chemistry.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Chemistry (12) Qualitative Analysis.	5.
German (1) or (4)	4.	German (1) or (4)	4.	German (1) or (4)	4.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	5.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Chemistry (20) Quantitative.	4.	Chemistry (20) Quantitative.	4.	Chemistry (20) Quantitative.	4.
Chemistry (21) Physical Chemistry.	2.	Chemistry (21) Physical Chemistry.	2.	Chemistry (21) Physical Chemistry.	2.
German (5) Scientific Reading.	4.	German (5) Scientific Reading.	4.	German (5) Scientific Reading.	4.
Physics (2) Mechanics and Heat.	3.	Physics (2) Electricity & Magnetism.	3.	Physics (2) Sound and Light.	3.
Shopwork (7) Woodwork.	3.	Shopwork (11) Forging.	3.	Metallurgy (2) Mineralogy.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

Electives three to five hours throughout the year.

The following are suggested: Mathematics (18, 19, 20), 5 hours; Drawing (3), 3 hours; Physiology (3) 3 hours; History (5), 4 hours; Economics (1), 4 hours.

THIRD YEAR

Chemistry (8) Organic.	5.	Chemistry (9) Organic.	5.	Chemistry (9) Organic.	5.
Metallurgy (5) Laboratory.	5.	Metallurgy (6) Assaying.	5.	Metallurgy (5) Laboratory.	5.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.

Electives five to eight hours throughout the year.

The following are suggested: Physical Laboratory, 3 to 5 hours; Geology, 5 hours—or Geology and Determinative Mineralogy, 5 hours; Shopwork, 3 hours.

FOURTH YEAR

Chemistry (17) Inorganic Preparations.	4.	Metallurgy (4) General.	5.	Chemistry (15) Sanitary.	4.
Metallurgy (4) Fuels and Iron.	5.	Chemistry (16) Applied.	3.	Ceramics (16) Applied.	3.
		Physiology (8) Bacteriology.	2.		

Electives to make the total work equal sixteen or eighteen hours, including Thesis work.

Students in Metallurgical Chemistry will take Ore Dressing the first term, and Metallurgy (4) 5, through the second term. For such students Chemistry (14, 15, 16) and Physiology (8) will not be compulsory.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of the study must lie within the field of Chemistry or Metallurgy. The subject must be announced to the President of the University (dependent upon the approval of the head of the department), not later than the beginning of the second term of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN ARCHITECTURE

This Course was established in 1896, to meet a growing demand for special training along this line. The extremely rapid developments, in late years, of novel methods of construction, the constantly extending list of materials used, and the creation of types of building entirely without precedent in the history of architecture, render it not only desirable, but imperative, that a large class of thoroughly trained and equipped men shall be brought forward, if this progress is to be maintained.

The employment in architecture of so many young men trained in other branches of engineering seems to prove the urgent need of those whose training is directed expressly to this end.

The Course offered gives a good training in mathematics, physics and mechanics, which are fundamental, together with a thorough drill in drawing, designing, shopwork, and the more technical branches of architecture proper.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	3.	Drawing (1) Freehand.	3.	Mathematics (17) Plane Analytics.	5.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Metallurgy (2) Mineralogy.	3.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Modern Language French or German.	4.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Modern Language French or German.	4.	Modern Language French or German.	4.	Drawing (2) Lettering.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	5.	Drawing (3) Shades, Shadows.	5.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics, Heat.	3.	Physics (2) Electricity, Magnetism.	3.	Physics (2) Light, Sound.	3.
Architecture (9) History of Architecture.	3.	Architecture (10) History of Architecture.	3.	Architecture (11) History of Architecture.	3.
Architecture (12) Detail Drawing.	2	Architecture (13) Detail Drawing.	2.	Architecture (14) Detail Drawing.	2.
Drawing (14) Pen Drawing.	2.				
Cadet Service.		Cadet Service.		Cadet Service.	

THIRD YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (7) Strength Materials.	5.
Architecture (15) Designing.	4.	Architecture (16) Designing.	2.	Architecture (17) Designing.	4.
Drawing (7) Photography.	2.	Drawing (12) Clay Modeling.	2.	Drawing (12) Clay Modeling.	2.
Elec. Engineering (6) Lectures.	2.	Elec. Engineering (6 & 7) Lectures and Lab.	4.		
Architecture (5) Decorations, etc.	3.	Civil Engineering (6) Stereotomy.	4.	Civil Engineering (19) Trusses.	5.
Rhetoric (3)	2.	Rhetoric (3)	2.	Rhetoric (3)	2.

FOURTH YEAR

Architecture (18) Designing.	4.	Architecture (4) Specifications.	2.	Architecture (6) Estimates and Supt.	4.
Civil Engineering (15) Masonry.	5.	Architecture (7) Heating, Vent., etc.	5.	Architecture (19) Designing.	4.
Mech. Engineering (23) Materials of Const.	4.	Architecture (8) Designing.	5.	Architecture (20) Thesis.	5.
Geology (5) General.	5.	Geology (6) Economic.	3.	Civil Engineering (21) Surveying.	3.
		Drawing (18) Color Work.	3.	Drawing (19) Color Work.	2.

THESIS

At the beginning of the fourth year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the beginning of the second semester of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

REQUIREMENTS FOR ADMISSION TO THE SHORT COURSES IN MINING, IN CLAY-WORKING AND CERAMICS, AND IN INDUSTRIAL ARTS

Applicants must not be less than sixteen years of age; and unless they are over twenty-one years of age must pass an examination in Arithmetic, Geography, Grammar and Orthography, or bring High School or other certificates for these branches.

Applicants who are over twenty-one years of age are admitted without examination.

SHORT COURSE IN MINING

The Short Course in Mining is especially designed for young men who have had a practical experience in mines, and wish to study Mine Surveying, Drafting, the problems of Ventilation, Drainage, Haulage, Mine Operating, etc., and also something of the sciences bearing upon their work, but have neither the time nor the preparation for a full college course. The first year is devoted to a thorough study of the elementary mathematics and sciences necessary to prepare the student for the practical work of the second year. The experience of the past eight years

has shown beyond any doubt that any enterprising young miner can master the subject sufficiently well in the time assigned to materially increase his earning capacity and chances for promotion in his occupation.

Personal instruction is given, and it is made thoroughly practical and of such a character as to best adapt it to the needs of the individual student.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.
Mathematics (3) Plane Geometry.	5.	Mathematics (13) Geometry.	5.	Mathematics (14) Trigonometry.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Geology (1) Physical Geography.	5.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Drawing (1) Freehand.	2.	Drawing (4) Draughting.	3.	Drawing (2) Lettering.	2.
Drawing (3) Projections.	3.	Geology (4) Elementary.	5.	Metallurgy (9) Mineral Chemistry.	5.
Chemistry (7) Inorganic.	5.	Chemistry (13) Laboratory.	3.	Mine Engineering (3) Mine Operating.	5.
Mine Engineering (1) Mine Surveying.	5.	Mine Engineering (2) Ventilation and Haulage.	5.	Shopwork (11) Forging.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

SHORT COURSE IN CLAY-WORKING AND CERAMICS

The two-year or Industrial Course is designed to assist young men who have already been actively engaged in the Ceramic industries, and who, on account of mature years, or lack of means, or lack of previous educational advantages, are unable to avail themselves of the full and complete course, and yet who wish to increase their earning power or chances of promotion by fitting themselves for other than routine labor. The requirements for admission to this course are very low, and the work required throughout is much less severe than that of the four-year course; in fact, anyone who is willing to really apply himself, can retain his membership in this class, but there is no place for any but those who are thoroughly in earnest, and poor work will not be accepted from those who are able to do good work.

In short, in this Industrial Course, the department recognizes its closest medium of communication with the wants of the clay industries, and it is intended to so maintain this course as always to render the greatest good to the greatest number.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Chemistry (12) Analytical.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Geology (1) Physical Geography.	5.
Mathematics (1) Algebra.	5.	Mathematics (3a) Geometry.	5.	Shopwork (11) Forging.	3.
				Shopwork (4) Chipping and Filing.	2.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Ceramics (1) Chemical Analysis.	5.	Ceramics (2) Analysis of Clays.	5.	Ceramics (3) Analysis of Glazes.	5.
Ceramics (4) General Principles.	5.	Ceramics (5) Bricks.	5.	Ceramics (6) Pottery.	6.
Geology (2) General.	5.	Geology (6) Economic.	3.	Drawing (11) Mechanical.	5.
		Drawing (1) Freehand.	2.		
Cadet Service.		Cadet Service.		Cadet Service.	

SHORT COURSE IN INDUSTRIAL ARTS

This Course is primarily designed to extend the benefits of the same kind of training as that given in the four-year course in this subject to that class of young men who may be unable for any reason to undertake a course of four years' duration, but who aspire to become actively engaged in factory work. It has been the aim to give, in as condensed a form as possible, those studies which will most rapidly and easily be turned to practical account in manufacturing operations; such as drawing, shop work, use of machine, tools, etc., together with a grounding in the physics and mathematics which underlie these operations.

The Course will be found most valuable to young men already engaged in factory work, who find themselves limited from rising in their work on account of lack of technical education.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	1.	Drawing (1) Freehand.	1.	Drawing (1) Freehand.	1.
Drawing (8) Geometric.	2.	Drawing (8) Projections.	2.	Drawing (2) Lettering.	2.
Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.
Mathematics (3) Plane Geometry.	5.	Mathematics (13) Space Geometry.	5.	Mathematics (14) Trigonometry.	5.
Shopwork (7) Carpentry & Pattern Making.	3.	Shopwork (9) Advanced Pattern Making.	3.	Shopwork (11) Forging.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Drawing (3) Projections.	3.	Drawing (3) Descriptive Geometry.	3.	Drawing (3) Shades, Shadows.	3.
Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Geology (1) Physical Geography.	5.
Shopwork (3), (4) Foundry and Chipping and Filing.	5.	Shopwork (13) Machine Work.	5.	Shopwork (15) Advanced Machine Work.	5.
Cadet Service.		Cadet Service.		Cadet Service.	

THE COLLEGE OF LAW

FOR ADMISSION

(Until September, 1901.)

The following are the requirements:

1. *To the First Year*—Applicants for admission to the First Year must present satisfactory evidence (by teacher's certificate—High School, Academy or College diploma—or by examination) of having a good common school education, including *United States History, Civil Government* and a thorough training in *English Composition.*

2. *The Second Year*—In addition to the requirements for admission to the First Year, applicants for admission to the Second Year must present satisfactory evidence of having completed the work of the First Year or its equivalent.

3. *To the Third Year*—In addition to the requirements for admission to the Second Year, applicants for admission to the Third Year must present satisfactory evidence of having completed the work of First and Second years, or its equivalent.

Students seeking a degree must, at the time of registration, present in addition to the requirements above mentioned satisfactory evidence of having completed a course of study, the minimum requirement of which is as follows:

Arithmetic, Civil Government, Geography, Grammar, History of the United States, Physical Geography, Physiology, Rhetoric, Physics, (Gage or an equivalent) *Geometry, Algebra,* (Wentworth's elements or an equivalent); and, in addition, the equivalent of 75 hours per week for one term of 12 weeks (a total of 900 hours) chosen from any five or more of the following subjects, one at least being a Science and two at least being in History or Political Science (unless the applicant is especially permitted to offer approved substitutes): *Botany, Chemistry, English Constitutional History, English History, English Literature, French, Geology, General History, German, Greek, Latin, Logic, Physics, Political Economy, Psychology, Surveying, Trigonometry, United States Constitutional History; provided,* that not less than 65 hours for twelve weeks (a total of 780 hours) of this work shall be of collegiate or university grade. If this last mentioned work has been done by the candidate in a College or University of good standing, certificates of such institution will be accepted. In all other cases the candidate is subject to examination on the work required from this last group. In general, in the absence of satisfactory certificates, opportunity will be given for examination in any subject required for admission as above indicated. Blanks for applications for degrees will be furfurnished on request.

FOR ADMISSION[1]

(On and after September, 1901.)

The following are the requirements:

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, or equivalents: Shakespeare's *Merchant of Venice, Julius Caesar,* and *Macbeth;* Milton's *Lycidas, Comus, L'Allegro, and Il Penseroso;* Burke's *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison;* The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of*

Wakefield; Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of all of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Taylor's Academic or equivalent.

4. *Botany*—Kellerman's Elementary Botany and Spring Flora

5. *Civil Government*—Fiske or Thorpe preferred.

6. *Geometry, Plane and Solid*—Venable, Wentworth or Wells.

7. *History*—Either Myers's General History (or equivalent); or, if the teacher's training and the school library will warrant, Greek and Roman History on the topical method. A circular concerning the topical method will be sent on application.

8. *Physics*—Carhart and Chute, Gage, Avery, or Appleton.

9. Any two of the following languages, in the quantity indicated below. Latin, Greek, French or German, or any one of them and the group of subjects named under (*e*) below.

(*a*) *Latin*—Pronunciation (the Roman method); Grammar (an exact knowledge of the inflections is essential); Cæsar, the first four books of the *De Bello Gallico;* Cicero, six orations, including *Pro Lege Manilia;* Vergil, the first six books of the *Aeneid,* with Prosody; Prose Composition, Daniell or Collar or Jones, entire.

(*b*) *Greek*—Grammar (Goodwin's preferred) and Prose Composition; or the first 100 lessons of White's Beginner's Greek Book. Reading: The first four books of Xenophon's *Anabasis.* At least two years should be devoted to this work.

(*c*) *French*—The whole subject of French Grammar. Applicants will be expected to read at sight easy French; and to translate correctly into French, simple English sentences. Two years ought to be given to this study, the first year being spent mainly on the Grammar with easy reading; the second devoted to reading good modern French, with grammatical analysis and exercises in writing. The texts read should be chiefly narrative and conversational prose; one or more prose comedies of the nineteenth (*not* the seventeenth) century should be included.

(*d*) *German*—Joynes-Meissner's or Thomas's Grammar is recommended. The essentials in these grammars should have been mastered thoroughly, *i. e.*, declensions of nouns and adjectives, pronouns, comparison of adjectives, prepositions, regular and irregular verbs and essentials of syntax. The following books or their equivalents must have been read (not less than 600 pages). Joynes's or Whitney's Reader; Hillern's Höher als die Kirche; Riehl's Der Fluch der Schönheit; Freytag's Die Verlorne Handschrift, Gerstäcker Irrfahrten.

(*e*) While the preferred requirement is that each candidate shall offer any two of the foregoing languages, he will be permitted to offer in place of one of the two the following group:

1. *Chemistry*—Williams' or Remsen's.
2. *Physiology*—Martin's (briefer course).
3. *English Literature*—Pancoast's Introduction to English Literature and an acquaintance with representative works in each period; or, *English History*, Montgomery.

In addition to the foregoing requirements for admission to the work of the College, *each candidate for a degree* must submit satisfactory evidence that he has successfully pursued a course of study equivalent to the first two years of any course leading to a degree in the College of Arts, Philosophy and Science, of this University. Where this work has been done in a college or university of approved standing, the certificate of said college or university will be accepted. In all other cases the candidate will be subject to examination in such work.

COURSE IN LAW

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
Elementary Law (including Domestic Relations)	15	Agency	2
		Contracts	4
		Criminal Law	3
		Sales	2
		Torts	4
	15		15

TEXT-BOOKS

First Semester — Elementary Law (Robinson, Walker, Tenth Ed., and Blackstone).

Second Semester — Agency (Mechem); Contracts (Bishop); Criminal Law (Hawley); Sales (Tiedeman); Torts (Cooley).

SECOND YEAR

Bailments	3	Construction of Contracts	2
Commercial Law	5	Evidence	2
Evidence	2	Partnership	2
Pleading	4	Pleading	2
Moot Court	1	Real Property	4
		Wills	2
		Moot Court	1
	15		15

TEXT-BOOKS

First Semester — Bailments (Hale); Commercial Law (Tiedeman); Evidence (Greenleaf, Sixteenth Ed.); Pleading (Phillips), and Kinkead's Selections.

Second Semester — Construction of Contracts (Jones); Partnership (Parsons); Real Property (Tiedeman); Wills (Page).

THIRD YEAR

Circuit and Supreme Court Practice	1	Corporations (Private)	2
Constitutional Law / International Law	4	Corporations (Municipal), Negligence of	3
		Ethics	2
		Federal Practice	2
Corporations (Private)	2	Mortgages / Suretyship	2
Corporations (Municipal)	2		
Equity Jurisprudence	4		
Probate Law	2	Trial Practice	2
Moot Court	1	Moot Court	1
	16		14

Thesis for graduation to count for two hours through second semester.

TEXT-BOOKS

First Semester — Constitutional Law (Black); Private Corporations (Taylor); Municipal Corporations (Tiedeman); Equity Jurisprudence; Probate Law (Whittaker's Probate Code).

Second Semester — Ethics (Sharswood); Trial Practice (Kinkead); Negligence of Municipal Corporations (Jones); Suretyship (Baylies).

PURPOSE AND METHODS

It is the purpose of this College to furnish such legal training as will secure the most favorable judgment of the profession, and such as will fit students for practice in any part of the country.

The aim is to teach an accurate knowledge of the principles of the law, and to illustrate the application of these principles to the practical affairs of life—to teach students both to know and to apply the law. The instruction offered includes a Course containing three years of nine months each. It requires about fifteen hours of lecture and recitation work per week each year, and embraces all the elementary and practical studies necessary for admission to the Bar of any State administering the Common Law.

The methods of instruction combine the advantages of all approved systems and appliances—the text-book and recitation system, the lecture system, and the case system. Charts, outlines, analyses, essays, note-taking, oral and written lectures, reviews and examinations are used; and exercises are given in drafting contracts, abstracts, conveyances, wills, protests, mercantile contracts, pleadings, indictments, and other legal papers. Briefs, arguments in moot courts, etc., are required. Attention is given to the study and accurate analysis of leading cases.

GENERAL REGULATIONS

IRREGULAR STUDENTS

In special cases, students who have had part of the studies of the First Year and part of those of the Second Year, or part of those of the Second Year and part of those of the Third Year, may be examined on whatever subjects they may select and may take part of the studies of both years, if the Faculty is satisfied that the applicants can do so to advantage. If candidates for a degree, such applicants must meet all the other requirements and have all the other qualifications of those seeking a degree.

SPECIAL STUDENTS

Persons wishing a knowledge of legal principles *for business purposes only*, but not intending to apply for a degree or to take a full course, may be admitted at any time as special students, and may avail themselves of such advantages of the College as they may deem expedient. Their convenience will not be taken into consideration in arranging classes, and they must make satisfactory arrangements as to fees, hours of recitation, etc., with the Dean.

ENTRANCE EXAMINATIONS

Entrance examinations, except for those seeking a degree, will not be technical; the object being to ascertain the results of previous training and practical capacity to appreciate the technical study of the law.

APPLICATIONS FOR DEGREES

At the time of registration all applicants who seek degrees should present their diplomas and certificates of work done. These certificates should state in detail

the studies pursued, the text-books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination, and the rank or standing of the candidate in it. A copy of the course of study must accompany the certificate in all cases, and must accompany it where equivalents are offered. These statements should also be accompanied by information as to age, occupation, experience, and work done since leaving school. Blanks for application will be furnished on request made to the Dean.

EXAMINATIONS

Examinations are held from time to time to test the student's knowledge of the work he has gone over. They are usually written, but sometimes oral.

THESIS

Each candidate for a degree is required to prepare and deposit with the Faculty, at least six weeks before the end of the year of graduation, a thesis of not less than fifteen hundred nor more than five thousand words, exclusive of citations of authorities, upon some subject selected by himself with the approval of the professor giving instruction in that division of law from which the subject is chosen.

DEGREES

The degree of Bachelor of Laws (LL. B.) will be conferred on all who, being at least twenty-one years of age and having met the requirements necessary for entrance for a degree, pass satisfactorily the examinations at the close of the Senior year, after having done at least the last year's work in the College of Law at the University, and having presented a thesis acceptable to the Faculty.

The degree of Master of Laws will be conferred upon any one who has received the degree of Bachelor of Laws at this University, or other approved University or College, upon completing the studies of the Graduate year, and satisfactorily passing an examination therein, and presenting a satisfactory thesis; the subject of which has been chosen from the field included in the Graduate year.

CERTIFICATES OF WORK DONE

Those who have completed the studies of the College, but have not complied with the requirements for a degree, will be given an official certificate, showing the work done, and signed by the President of the Board of Trustees, the President of the University, and the Dean of the College of Law.

ADMISSION TO THE BAR

The regular Supreme Court examination for the admission to the bar is held on the first Tuesday in June of each year. Seniors are required to take this examination before they can receive the degree or certificate above mentioned.

COURSE OF INSTRUCTION

The Course of Study is three years of nine months, or thirty-six weeks, each; covering about fifteen hundred hours of work. It is so arranged that each class will have an average of three recitations a day, each one hour in length, thereby doing the same amount of work that is done in a regular University course.

MOOT COURT

Second Year and Third Year students will have Moot Court, under the supervision of the Dean, throughout the year, not less than one hour each week. The

object of Moot Court is to give practical insight into the conduct of trials, examination of witnesses, production of evidence, etc.

ADVANTAGES

LOCATION

Attention is called to Columbus as a place in which to study law. Here the Legislature meets. Here are the Supreme Court and Circuit Court; four branches of the Common Pleas Court, in almost daily session throughout the college year; the Probate Court, the County Commissioners, the City Court, the several Magistrates' Courts; also the U. S. Circuit and District Courts. All are easy of access from the College. "There is no place where law is learned so quickly and thoroughly as among the lawyers. No teaching is so effective as the object lessons of the trial of cases in court."

LIBRARIES

The following libraries are accessible to the students:

The Law Library of the College contains the Noble Law Library, the Emerson McMillin Law Library, the Critchfield Law Library, and three sets of the Ohio and the Ohio State Reports; about 3,000 well selected volumes.

The University Library contains 25,000 volumes of very carefully selected books upon all subjects. This is quite complete in the more recent standard works upon history and political science, philosophy, etc. A good collection of the leading scientific, technical and literary magazines and journals is to be found here.

The State Law Library, of about 35,000 volumes—the largest and most complete Law Library in the State. It contains complete sets of the English, Scotch, Irish, Canadian, United States, and State Reports, Statutes and Digests, as well as all the important text books and leading periodicals published. This library is located in the new State Supreme Court building. It is designed wholly for reference, and students are warned that they must not use the library rooms as a study room, and that the text books found here are to be used for reference only. No student is expected, nor will he be permitted, to use these books instead of providing himself with those required in the course.

The State Library, in the State House—a library of general literature, history, science, biography, political and social science, philosophy, etc., comprising some 65,000 volumes. The leading magazines, journals, etc., are also to be found here.

The University Libraries are open from 7:30 a. m. to 9:30 p. m. during the five days in which the University is in session, and on Saturdays from 8 a. m. to 4 p. m. The State Law Library is open six days in the week, from about 8:30 a. m. to 5:30 p. m., with the exception of about an hour or an hour and a half at noon. The State Library is open six days in the week from 9 a. m. to 12 m., and from 2 p. m. to 5 p. m.; and when the Legislature is in session, from 7 p. m. to 9 p. m.

The City Library, with 30,000 volumes and a fine reading room, may also be used by students, under reasonable restrictions.

THE UNIVERSITY COURSES

Attention is called to the great advantage of attending a law school in close and vital connection with the University affording the means of a liberal, practical and technical education. Students who are disposed to work faithfully may, at the same time that they are acquiring a technical knowledge of the law, supplement their general education by joining University classes, in departments which they may elect, subject to the requirements for admission to such departments, without extra charge except for laboratory work. Not alone from the courses in History and Political Science, or from those in Mental and Moral Philosophy, should this

work be selected, but also from the courses in Civil, Mine, Mechanical, and Electrical Engineering, from the courses in Anatomy and Physiology, Economic Geology, etc. To the average practitioner, there will come ten questions involving the principles of surveying or engineering to one of the constitutional law or English history. Not a day passes in the litigation of the courts but that numerous questions of anatomy, physiology, surveying or engineering arise and are to be decided. Particular attention, therefore, is called to the technical courses offered by the University, which will be open to those in the College of Law who are able to take them without interfering with the required law work. The following departments offer courses which will prove beneficial to those who have not had such training as would enable them to take more technical work: Botany, Physiology, Physics, Civil Engineering, Mine Engineering, Chemistry (Toxicology), Geology, Philosophy, History, English.

EXPENSES

Each undergraduate student of the University is required to pay an incidental fee of fifteen dollars a year, and in this College a tuition fee of forty-five dollars; a total of thirty dollars for each semester, which is payable at the beginning of each semester.

Graduate students are required to pay a fee of thirty dollars for the year.

A fee of five dollars (to cover the expenses of graduation, diplomas, certificates, etc.,) is charged to all who receive the diploma or certificate, and a fee of ten dollars is charged to those taking the degree of Master of Laws. These fees must be paid before the degrees are conferred, or certificates delivered.

Good boarding and lodging, convenient to the University, can be obtained at from $3.50 to $5.00 per week.

The text-books used in this College can be obtained at the University at students' prices. The University has no pecuniary interest in these books or the sale of them, and they are permitted to be sold here merely for the convenience of the students.

The books for the first year	$41 00
For the second year	40 00
For the third year	36 00
Total for three years	$117 00

THE COLLEGE OF PHARMACY

FOR ADMISSION TO THE FOUR-YEAR COURSE[1]

The following are the requirements:

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, or equivalents: Shakespeare's *Merchant of Venice, Julius Caesar,* and *Macbeth;* Milton's *Lycidas, Comus L'Allegro, and Il Penseroso;* Burke's *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison;* The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of oll of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Taylor's Academic or equivalent.
4. *Botany*—Kellerman's Elementary Botany and Spring Flora or equivalent.
5. *Civil Government*—Fiske or Thorpe preferred.
   Or History—Myers's *General History.*
6. *Geometry, Plane and Solid*—Venable, White, Wentworth, or Wells.
7. *Latin*—Pronunciation (the Roman Method); Grammar (an exact knowledge of the inflections is essential); Cæsar, the first three books of the *De Bello Gallico.*

Or *German*—Joynes-Meissner's or Thomas's Grammar is recommended. The essentials in these grammars should have been mastered thoroughly, i. e., declensions of nouns and adjectives, pronouns, comparison of adjectives, prepositions, regular and irregular verbs and essentials of syntax.

The following books or their equivalents must have been read (not less than 600 pages.) Joynes's or Whitney's Reader; Hillern's Höher als die Kirche; Riehl's Der Fluch der Schöenheit; Freytag. Die Verlorne Handschrift; Gerstäcker Irrfahrten.

For the present, the *German* required for admission may be begun at the University, but without University credits.

8. *Physics*—Carhart and Chute, Gage, Avery, or Appleton.

COURSE IN PHARMACY

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

Degree: Bachelor of Science in Pharmacy

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Chemistry (12) Qualitative Analysis.	5.
Latin (1) Pharmaceutical or	5.	Latin (1) Pharmaceutical or	5.	Latin (1) Pharmaceutical or	5.
German (1) Elementary.	4.	German (1) Elementary.	4.	German (1) Elementary.	4.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Spherical Trigonometry, Algebra.	5.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

SECOND YEAR

Botany (6*a*) Systematic, Physiological.	5.	Botany (4) Medical.	2.		
Chemistry (20) Laboratory.	4.	Chemistry (20) Laboratory.	4.	Chemistry (20) Laboratory.	4.
German (2) Scientific Reading.	2.	German (2) Scientific Reading.	2.	German (2) Scientific Reading.	2.
Pharmacy (6) General Processes.	3.	Pharmacy (7) U. S. Pharmacopeia.	5.	Pharmacy (8) Dispensatories, etc.	5.
Physics (11) Mechanics and Heat.	3.	Physics (11) Electricity & Magnetism.	3.	Physics (11) Sound and Light.	3.
				Metallurgy (2) Mineralogy.	3.
Chemistry (21) Advanced Inorganic and Physical.	2.	Chemistry (21) Advanced Inorganic and Physical.	2.	Chemistry (21) Advanced Inorganic and Physical.	2.
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

THIRD YEAR

Pharmacy (9) General Processes.	5.	Pharmacy (10) Prescriptions.	5.	Pharmacy (11) Dispensatories, etc.	5.
Pharmacy (12) Materia Medica.	3.	Pharmacy (13) Materia Medica.	3.	Pharmacy (14) Mat. Medica & Thera.	3.
Physiology (1) Human Anatomy.	3.	Physiology (1) Physiology.	3.	Physiology (1) Physiology.	3.
General Chemistry (8) Organic.	5.	Physiology (8) Bacteriology.	2.	Physiology (5) Microscopy.	2.
		General Chemistry (9) Laboratory.	5.	General Chemistry (9) Laboratory.	5.

FOURTH YEAR

Geology (5) General.	5.	Geology (6) General.	3.	General Chemistry (11) Toxicology.	4.
Pharmacy (15) Assaying.	5.	Pharmacy (16) General.	5.	Pharmacy (17) General.	5.
Thesis.		Thesis.		Thesis.	

Chemistry elective for the year — five hours.
Elective, three hours through the year.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis embodying the results of special study and research. The subject must be within the field of Pharmacy, and must be announced to the President of the University (dependent upon the written approval of the proper authorities) not later than the beginning of the second term of the fourth year of the Course. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

SHORT COURSE IN PHARMACY

FOR ADMISSION

Candidates for admission who are less than twenty-one years of age must be prepared in the common English branches. Teachers' certificates (in force), or credentials from approved schools, will be accepted in lieu of an examination.

FIRST YEAR

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Botany (1) Elementary.	5.
Latin (1) Pharmaceutical.	5.	Latin (1) Pharmaceutical.	5.	Chemistry (12) Qualitative Analysis.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Latin (1) Pharmaceutical.	5.
Pharmacy (6) General Processes.	3.	Pharmacy (7) U. S. Pharmacopeia.	5.	Pharmacy (8) Dispensatories, etc.	5.
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

SECOND YEAR

Botany (6*a*) Systematic, Phys.	5.	Botany (4) Medical.	2.	Chemistry (11) Toxicology.	4
Chemistry (18) Organic.	5.	Chemistry (18), (19) Organic.	5.	Chemistry (19) Organic, Quantitative.	5.
Pharmacy (9) Phar. Chemistry.	5.	Pharmacy (10) Prescription Practice.	5.	Pharmacy (11) Dispensing Practice.	5.
				Physiology (1) Physiology.	3.
Physiology (1) Human Anatomy.	3.	Physiology (1) Physiology.	3.	Physiology (5) Microscopy.	2.
		Physiology (8) Bacteriology.	2.		
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

COLLEGE OF VETERINARY MEDICINE

FOR ADMISSION[1]

The following are the requirements:

I. For applicants for certificates of Veterinary Surgeon: *Arithmetic, Geography* and *Grammar.*

II. For applicants who intend to become candidates for the degree of Doctor of Veterinary Medicine:

1. *Arithmetic, Grammar, and Descriptive and Physical Geography.*

2. *English Composition and Rhetoric*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of two essays of about two hundred words each. The first essay will be upon a subject drawn from the candidate's observation or experience; as "A description of my native town," "The most remarkable person I ever met," "My reasons for seeking a University education." The second essay will be upon a subject drawn from a list of classics which will be furnished on application.

3. *History*—History of the United States, Johnson preferred.

4. *Latin or German*—One year.

5. *Pyhsics*—Gage, Carhart and Chute, Avery, or Appleton.

6. *Botany*—Kellerman's Elementary Botany and Spring Flora or equivalent.

COURSE IN VETERINARY MEDICINE

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

Degree: Doctor of Veterinary Medicine

FIRST YEAR

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Agr'l Chemistry (1) Principles.	5.	Agr'l Chemistry (8) Organic.	5.	Agr'l Chemistry (9) Applications.	5.
Physiology (1) Human Anatomy.	3.	Physiology (1) Physiology.	3.	Physiology (1) Physiology.	3.
Physiology (4) Histology.	5.	Physiology (4) Histology.	5.	Physiology (4) Phys. Chemistry.	5.
Veterinary Medicine (28) Anatomy.	5.	Veterinary Medicine (28) Anatomy.	5.	Veterinary Medicine (28) Anatomy.	5.
Cadet Service.		Cadet Service.			

SECOND YEAR

Agriculture (8) Breeds of Live Stock.	4.	Agriculture (9) Stock Breeding.	4.	Agriculture (10) Stock Feeding and Hygiene.	4.
Pharmacy (12) Materia Medica.	5.	Pharmacy (13) Materia Medica.	5.	Pharmacy (18) Laboratory.	5.
Veterinary Medicine (14) General Pathology.	4.	Veterinary Medicine Theory & Practice.	5.	Veterinary Medicine Theory & Practice.	5.
Veterinary Medicine Helminthology.	1.	Veterinary Medicine (18) Surgical Diseases.	5.	Veterinary Medicine (18) Surgical Diseases.	5.
Veterinary Medicine (19) Clinic.	12.	Veterinary Medicine (19) Clinic.	12.	Veterinary Medicine (19) Clinic.	12.
Veterinary Medicine (24) General Surgery.	5.				
Cadet Service.		Cadet Service.		Cadet Service.	

[1] An applicant for admission who may be somewhat in arrears in any given subject, will find opportunity to make up this work in the Columbus High Schools, which are fully accredited by the University.

THIRD YEAR

First Term.	Credit hours
Veterinary Medicine Theory & Practice.	3.
Veterinary Medicine (19) Clinic.	12.
Veterinary Medicine (27) Meat Inspection.	4.
Veterinary Medicine (18) Surgical Diseases.	5.
Veterinary Medicine (31) Canine Diseases.	3.
Veterinary Medicine Milk Inspection.	1.

Second Term.	Credit hours
Veterinary Medicine (21) Theory & Practice.	3.
Veterinary Medicine (25) Practice in Operating.	3.
Veterinary Medicine (19) Clinic.	12.
Physiology (6) Bacteriology.	3.
Veterinary Medicine (23) Obstetrics.	3.
Veterinary Medicine (32) Canine Diseases.	3.
Thesis	2.

Third Term.	Credit hours
Veterinary Medicine (22) Therapeutics.	5.
Veterinary Medicine (19) Clinic.	12.
Veterinary Medicine (26) Horse Shoeing.	5.
Veterinary Medicine (33) Opthalmology.	2.
Thesis	2.

THESIS

As a requisite for graduation candidates for the degree of D. V. M. must present an acceptable thesis embodying the results of a special research. The subject must be announced to the President of the University (dependent upon the written approval of the head of the department in which it lies) not later than the beginning of the second term of the third year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

Candidates for a Certificate of Veterinary Surgeon are not required to present a thesis.

THE DEPARTMENTS

The Departments

1900-1901

The subjects set forth under each Department limit and define the administrative authority and responsibility of the head of that Department.

AGRICULTURE

[Townshend Hall]

Professor Hunt, Associate Professor Gibbs, Assistant Professor Decker, Mr. Herrick, Mr. Ruhlen.

8[1]. **BREEDS OF LIVE STOCK.** Lectures and recitations three times a week upon the history, characteristics, adaptation, care and management of the different breeds of domestic animals. Practicum once a week in scoring and judging live stock. First term.

9. **PRINCIPLES OF BREEDING.** Lectures and recitations three times a week upon laws of heredity and their practical applications. Practicum once a week in scoring and judging live stock, and in writing and tracing pedigrees. Second term.

10. **STOCK FEEDING AND HYGIENE.** Lectures and recitations three times a week upon the laws of nutrition, the character of food stuffs, the relation of the food to the animals, and the kind and quantity of food to produce given effects. Practicum once a week in calculating digestibles, nutritive ratios and feeding standards. Third term.

11. **FARM EQUIPMENT.** Lectures and recitations three times a week upon selecting, planning and equipping farms; planning and erecting farm buildings and fences; building roads; farm vehicles and machinery; power, water and drainage. Practicum once a week in drawing plans of farms and farm buildings; leveling and laying drains; dynamometer tests of wagons and farm implements. First term.

12. **SOILS.** Lectures and recitations three times a week upon the origin, formation, kinds, and physical properties of soils, and their improvement by cultivation, fertilization, drainage, and irrigation. Practicum once a week in laboratory testing physical properties of several soils, determining the relation of soils to heat, moisture, air, and fertilizers, and making mechanical analysis. Second term.

13. **FARM CROPS.** Lectures and recitations three times a week upon the history, production, marketing, cultivation, and harvesting of farm crops. Practicum once a week with growing and dried specimens of farm crops, including grasses, clovers, and other forage crops. Third term.

14. **ANIMAL MECHANICS AND EXTERIOR.** Lectures and recitations three times a week upon animal mechanics, proportions, and the relation of the latter to specific uses. Practicum once a week in measuring animals and testing the value of given measurements for given purposes. First term.

[1] These numbers are "finding numbers," and do not necessarily indicate the sequence of topics.

15. **BUTTER MAKING AND CHEESE MAKING.** Recitations twice a week. Laboratory practice two half days each week in running separators, churning and working butter, making cheese, and testing and pasteurizing milk. Second term.

16. **HISTORY OF AGRICULTURE AND RURAL ECONOMICS.** Lectures and recitations upon the history of agriculture; present agricultural methods in various countries; cost and relative profits of various farm operations and systems. Four times a week. Third term.

5. **DAIRY FARMING.** Lectures twice a week upon breeds, and upon feeding, breeding and selecting dairy stock; equipment and management of dairy farms. Practicum once a week in scoring and judging live stock, writing pedigrees, and calculating feeding standards. Second term.

6. **BUTTER MAKING AND CHEESE MAKING.** Practice in running separators, churning and working butter, etc., making cheese and testing and pasteurizing milk. Four half days each week. Second term.

7. **BUTTER MAKING AND CHEESE MAKING.** Lectures and recitations. Two hours each week. Second term.

15. **BUTTER AND CHEESE MAKING.** Lectures twice a week. Laboratory practice twice each week. This course is the same as courses 6 and 7, except that less laboratory practice is taken. Second term.

17. **MILK SANITATION.** Three times a week. First term. Lectures on and laboratory practice in what constitutes pure dairy products.

AGRICULTURAL CHEMISTRY

[Townshend Hall, Rooms 29, 35, 34 and 30]

Professor Weber, Mr. Vinsom

1. **PRINCIPLES OF CHEMISTRY AND CHEMICAL NOMENCLATURE.** Lectures and text-books for three or four weeks, five times a week; then lectures twice a week on Chemistry of Non-metals, and laboratory practice three times a week. First term.

8. **ORGANIC CHEMISTRY.** Lectures twice a week; laboratory practice three times a week. Second term.

9. **APPLICATION OF CHEMISTRY TO AGRICULTURE.** Lectures twice a week; laboratory three times a week. Third term.

4. **LABORATORY.** Analysis of fertilizers, feed-stuffs, dairy products, fruits, vegetables, alcoholic liquors, etc. Five laboratory periods a week through the year.

7. **CHEMISTRY OF MILK AND MILK TESTING.** Twice a week. Dairy Course.

6. **LABORATORY.** Elective. Five or three times a week through the year.

AMERICAN HISTORY AND POLITICAL SCIENCE

(*See* History.)

ANATOMY AND PHYSIOLOGY

[Biological Hall, Rooms 12 and 20]

Professor Bleile, Assistant Professor Morrey, Mr. Dresbach

COLLEGES OF AGRICULTURE, PHARMACY, AND VETERINARY MEDICINE

1. **HUMAN ANATOMY AND PHYSIOLOGY.** Lectures, recitations and laboratory work three times a week. First, second and third terms. This course must be preceded by, or accompanied with, a course of chemistry.

2. **GENERAL PHYSIOLOGY.** Lectures recitations and demonstrations. Three times a week. Third term. [Short Course in Agriculture.]
3. **CHEMICAL PHYSIOLOGY.** Three times a week. Third term. [Domestic Economy Course.]
4. **HISTOLOGY AND HISTO-CHEMISTRY.** Five times a week through the year. This course must be preceded by, or accompanied with, a course in chemistry.
5. **MICROSCOPY AND URINARY ANALYSIS.** Lectures and laboratory work. Twice a week. Third term.
6. **BACTERIA.** in their relation to Milk, Butter and Cheese. Lectures and laboratory work. Twice a week. Second term.
7. **BACTERIOLOGY.** Three times a week. Second term. [Veterinary Medicine.]
8. **BACTERIOLOGY.** One lecture, one laboratory period, a week. Second term. [Pharmacy.]
9. **PHYSIOLOGICAL LABORATORY.** Three times a week. [May include work in bacteriology.]

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

First Semester

51[1]. **HUMAN ANATOMY AND PHYSIOLOGY.** Lectures, recitations and laboratory work. Three times a week.
53. **PHYSIOLOGICAL LABORATORY.** Three laboratory periods a week.
55. **PHYSIOLOGICAL LABORATORY.** Five laboratory periods a week.
57. **BACTERIOLOGY.** One lecture, one laboratory period a week.
59. **HISTOLOGY AND HISTO-CHEMISTRY.** Laboratory. Five laboratory periods a week.
61. **BACTERIOLOGY.** One lecture, two laboratory periods a week.

Second Semester

52. Continuation of Course 51. Three times a week.
54. Continuation of Course 53. Three laboratory periods a week.
56. Continuation of Course 55. Five laboratory periods a week.
58. **MICROSCOPY.** Lectures and laboratory work. Twice a week. Last half of semester.
60. Continuation of Course 59. Five laboratory periods a week.
62. Same as Course 61.

ANCIENT ART

(*See* Greek Language and Literature.)

ARCHITECTURE

(*See* Drawing.)

[1] "Finding numbers" from 51 upwards always indicate Semester work.

ASTRONOMY

[The Emerson McMillin Observatory.]

Associate Professor H. C. Lord, Director of the Observatory.
Mr. J. Warren Smith, Lecturer on Meteorology.

COLLEGE OF ENGINEERING

4. **ASTRONOMY, GEODESY AND LEAST SQUARES.** Lectures on practical Astronomy, supplemented by practice with the instruments of the Emerson McMillin Observatory. Text-book, Doolittle. Three times a week. (First Term, third year, Course in Civil Engineering.)
5. Continuation of 4. Three times a week. (Second Term, third year, Course in Civil Engineering.)
6. Continuation of 5. Four times a week. (Third Term, third year, Course in Civil Engineering.)

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

61, 62. **GENERAL ASTRONOMY.** Lectures and recitations twice a week throughout the year.

63, 64. **ASTRONOMY AND GEODESY.** Lectures on practical Astronomy, supplemented by practice with the instruments of the Emerson McMillin Observatory. Open to students who have had the Calculus. Text-book, Doolittle. Three times a week throughout the year.

55, 56. **THEORETICAL ASTRONOMY.** Lectures and Observatory practice. The theory of the undisturbed motion of a planet or comet and the calculation of ephemerides. Parabolic orbits from three complete observations. Orbits from three complete observations, including the eccentricity. Work in the Observatory with the twelve-inch equatorial. Definite orbits. Observatory work continued. Authorities: Watson, Klinkerfeus, Appolzer, and the astronomical journals. Five times a week throughout the year.

57, 58. **ASTRO - PHYSICS.** Lectures on the theory of the Spectroscope and its use in Astronomy, supplemented by practice with the large spectroscope of the Observatory. Five times a week through the year.
Astronomy 55, 56, 57, 58 are open only to students who have had Calculus.

60. **METEOROLOGY.** Twice a week. Second half, second semester. Same as 3.

3. **METEOROLOGY.** Lectures on practical meteorology, supplemented by laboratory work in map and chart making, and regular observations with the instruments in use by Weather Bureau. Text-book, Davis; with the daily weather maps issued by the Bureau. Twice a week, third term.

BOTANY

[Botanical Hall]

Professor Kellerman, Mr. Schaffner, Mr. Collett, Miss Dufour

COLLEGES OF AGRICULTURE, PHARMACY AND VETERINARY MEDICINE

1. **ELEMENTARY BOTANY.** Lectures, recitations and field work. Text-book: Kellerman's *Elementary Botany* and *Spring Flora* Must precede all other courses in this department except course 9. Five times a week. Third term.

4. **MEDICAL BOTANY.** Twice a week, second term. Similar to course 56 in the College of Arts, Philosophy and Science. Rerefence book: Maisch's *Organic Materia Medica.*

6. **PHYSIOLOGICAL BOTANY.** Lectures, recitations and laboratory work. Coulter's Plant Structures. Five times a week. First term.

6*a*. **SYSTEMATIC AND PHYSIOLOGICAL BOTANY.** Lectures, recitations and laboratory work. Coulter's Plant Structures. Five times a week. First term.

7. **PHYSIOLOGICAL AND ECONOMIC BOTANY.** Lectures, recitations and laboratory work. Coulter's Plant Structures. Five times a week. Second term.

8. **VEGETABLE PATHOLOGY.** Lectures, recitations and laboratory work. Five times a week. Third term.

9. **DENDROLOGY.** Lectures, field and laboratory work. Twice a week, first term. Open to students who have not studied Botany.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

First Semester

51. **ECOLOGY AND PHYSIOLOGY.** Lectures and recitations twice a week; laboratory work once a week; credit three hours. Coulter's Plant Relations.

57. **LABORATORY WORK.** Fungi, Algæ, Bryophyta. Two or three times a week.

59. **ADVANCED LABORATORY WORK IN HISTOLOGY AND PHYSIOLOGY** Five times a week. Open to students who have taken Course 51, or 57.

61. **SYSTEMATIC BOTANY, PHENOGAMIC AND CRYPTOGAMIC.** Three to five times a week. Open to students who have taken Course 51, or 57.

63. **MONOGRAPHIC WORK.** Graduate Course. Credit five or ten hours.

65. **RESEARCH WORK IN MORPHOLOGY AND PHYSIOLOGY.** Graduate Course. Credit five or ten hours.

Second Semester

52. **MORPHOLOGY AND CLASSIFICATION.** Lectures and recitations twice a week; laboratory work once a week; credit three hours. Coulter's Plant Structures.

58. Continuation of Course 57. Pteridophyta, Gymnospermæ, Angiospermæ. Two or three times a week.

60. Continuation of Course 59. Five times a week.

62. Continuation of Course 61. Three to five times a week.

64. Continuation of Course 63. Credit five or ten hours.

66. Continuation of Course 65. Credit five or ten hours.

For Summer Courses in Botany, see Lake Laboratory.

CHEMISTRY

[CHEMICAL HALL, Rooms 24, 25, 14, 21, 22, 7 and 18]

Professor McPherson, Professor Norton, Assistant Professor Henderson
Mr. Kohr, Mr. Gore

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

First Semester

51. **ELEMENTARY CHEMISTRY.** Arranged for students who have little or no knowledge of Chemistry. Three sub-divisions; one lecture, one quiz, and three hours' laboratory practice weekly. In the laboratory the student performs an extended series of experiments illustrating the principles of Chemistry. Three hours credit.

53. QUALITATIVE ANALYSIS. Laboratory, lectures and quiz. Students familiarize themselves with the properties of the elements with a view to their detection, and then apply this knowledge to analysis of unknown substances. Three to five times a week. This course must be preceded by Courses 51 and 52.

55. QUANTITATIVE ANALYSIS. Laboratory, lectures and recitations. Use of the balance and general principles of gravimetric analysis. Drill in the solution problems in quantitative analysis; study of properties of precipitates; principles of volumetric analysis. Selections are made from such analytical methods as best meet the needs of the student. The samples used for analysis are mixtures or commercial products the percentage composition of which is not made known to the student until he has reported his own results. Three to five times a week. This course must be accompanied by course 69.

57. ORGANIC CHEMISTRY. Laboratory, lectures and recitations. Open only to students who are familiar with at least the principles of quantitative analysis. Five times a week.

59. ADVANCED CHEMISTRY. Laboratory. Arranged for special students who have had courses 53, 54, 55, 56, 57; also course 58 for students in Organic Chemistry. Students are allowed to select such work as they are capable of undertaking—as, the critical examination of analytical methods as well as the study of new methods. Five times a week.

61*a*. INORGANIC PREPARATION. Laboratory. This course includes the preparation of inorganic substances from the crude materials. Special attention is given to the preparation of chemically pure compounds, to be used in certain quantitative processes. Thorpe's text-book on Inorganic Preparations is used, and reference is made to Bender and Erdmans' *Anorganische Präparate* and Krausche's *Pruefung Chemischer Reagientien*. This course must be preceded by quantitative analysis. Four times a week until the Christmas Recess.

Students electing this course must follow with theoretical chemistry and sanitary analysis.

61*c*. HISTORICAL CHEMISTRY. Lectures and recitations. A course of twelve weeks beginning after the Christmas Recess. Four times a week. Given biennially, offered in 1900–1901.

63. CHEMICAL SEMINARY. Special students will meet to discuss special topics and reviews of current literature. Once a week.

65. ELECTROLYTIC ANALYSIS. Laboratory. Extended practice is given in quantitative electrolytic analysis. Twice a week.

69. ADVANCED GENERAL CHEMISTRY; PHYSICAL CHEMISTRY. This course includes (*a*) a general survey of inorganic chemistry based upon the arrangement of the elements in accordance with the Periodic Law and (*b*) a discussion of the main principles of physical chemistry and their application to general processes. Twice a week.

Second Semester

52. Continuation of Course 51. Three hours credit.

54. Continuation of Course 53, including use of Spectroscope.

56. QUANTITATIVE ANALYSIS. Continuation of Course 55. Three to five times a week. This course must be accompanied by Course 70.

58. **ORGANIC CHEMISTRY.** Laboratory and lectures. Continuation of Course 57. Arranged for students who wish to specialize in organic chemistry. The course includes further preparation of typical organic compounds, their purification and analysis. Five times a week.

60. Continuation of Course 59.

64. Continuation of Course 63.

66. Repetition of Course 55.

68. **SANITARY ANALYSIS.** Laboratory and lectures. A study of the most important chemical methods for the analysis of water and air. This course must be preceded by quantitative analysis, and at least the equivalent of Course 61 in Anatomy and Physiology (bacteriology). The course extends over the last ten weeks of the second semester. Four times a week.

70. Continuation of Course 69.

Students who can elect but one year of Analytical Chemistry, will take Courses 53 and 66. Others will take 53 and 54, then follow with 55, 56 and 57.

COLLEGES OF ENGINEERING AND PHARMACY

7. **ELEMENTARY CHEMISTRY.** Inorganic. Lecture, Laboratory and Quiz. Laboratory work; First Term, experiments upon the non-metals; second term, principles of quantitative analysis. Five times a week.

8. **ORGANIC CHEMISTRY.** Lectures. Five times a week, first term.

9. **ORGANIC CHEMISTRY.** Laboratory and recitations. Five times a week. Second and third terms.

11. **TOXICOLOGY.** Four times a week. Third term.

12. **QUALITATIVE ANALYSIS.** Five times a week. Third term.

13. **QUALITATIVE ANALYSIS.** Three laboratory periods a week. Second term.

15. **SANITARY ANALYSIS.** Laboratory and lectures. A study of the most important chemical methods for the analysis of water and air. Four times a week. Third term.

16. **APPLIED CHEMISTRY.** Lectures on Industrial Chemistry. These are made as practical as possible by visits to different chemical works. When possible specialists deliver lectures on subjects belonging to their particular line of work. Four times a week. Second term.

17. **INORGANIC PREPARATIONS.** This course includes the preparation of chemically pure inorganic substances from the crude materials. Four times a week. Third term.

18. **ORGANIC CHEMISTRY.** Lectures and laboratory. Five times a week, for the first half of the year.

19. **QUANTITATIVE ANALYSIS.** Lectures and Laboratory. Five times a week for the second half of the year.

20. **QUANTITATIVE ANALYSIS.** Laboratory, lectures and recitations. Four times a week.

21. **ADVANCED GENERAL CHEMISTRY; PHYSICAL CHEMISTRY.** Twice a week.

For Courses in the technical analysis of iron, steel and allied products, see the Department of Mining and Metallurgy.

Four Courses dealing with the application of Chemistry to Agriculture, see the Department of Agricultural Chemistry.

CIVIL ENGINEERING

[HAYES HALL, Rooms 14 and 19]

Professor Brown, Assistant Professor Sherman, Mr. Groves

1. **LAND SURVEYING.** Recitations and field work. Johnson's Theory and Practice of Surveying. Six times a week. First term. Second year.

2. **RAILROAD SURVEYING.** Recitations and field work. Searle's Field Engineering. Six times a week. Third term. Second year.

3. **TOPOGRAPHICAL SURVEYING.** Lectures, field work and drawing. Johnson's Surveying used for reference. Four times a week. First term. Third year.

4. **TOPOGRAPHY.** Platting, pen and tinted work. Reed's Topographical Drawing and Sketching. Four times a week. Second term. Second year.

5. **STEREOTOMY.** Recitations, drawing and model cutting. Warner's Stereotomy. Four times a week. Second term. Third year.

7. **BRIDGE STRAINS.** Recitations and lectures. Part I of Dubois's Strains in Framed Structures. Five times a week. Third term. Third year.

8. **BRIDGE DESIGNING.** Lectures and drawing. Part II of Dubois's Strains in Framed Structures and Johnson's Modern Framed Structures used for reference. Five times a week. First term. Fourth year.

10. **SANITARY ENGINEERING.** Lectures. Five times a week. Third term. Fourth year.

14. **CIVIL ENGINEERING LABORATORY.** Cement testing, adjustment of instruments. Twice a week, Second term. Fourth year.

15. **MASONRY CONSTRUCTION.** Recitations and lectures. Baker's Masonry Construction. Five times a week. First term. Fourth year.

6. **HIGHWAYS.** Lectures on roads, streets, canals, railroads and rivers. Five times a week. Second term.
Fourth year students in Civil Engineering must elect either 16 or 17.

17. **RAILWAY LOCATION.** Recitations and lectures. Wellington's Economic Theory of Railway Location. Five times a week. Second term.
Fourth year students must elect either 16 or 17.

18. **WATER SUPPLY.** Recitations and lectures. Fanning's Water Supply. Five times a week. Third term. Fourth year.

19. **TRUSSES.** Lectures and drawing. Five times a week. Third term. Third year, Mine Engineering and Mechanical Engineering.

20. **ROOF TRUSSES.** Lectures and drawing. Five times a week. First term. Third year, Architecture.

21. **SURVEYING.** Recitations and field work. Davies' Surveying. Three times a week. Third term.
Third year, Architecture.

22. **SUMMER COURSE IN FIELD WORK.** The students are taken into camp in a rough, broken country and given a thorough drill in land and elementary railroad surveying. The course begins directly after commencement day, and continues four weeks of six days per week, ten hours per day. The work of the student and the discipline of the camp is in the hands of competent instructors. This course must be preceded by Courses 1, 2 and 4. Students conditioned on any of these courses, may be admitted at discretion of instructor in charge. (At conclusion of second year of course.)

23. **SUMMER COURSE IN FIELD WORK.** Similar to Course 22. Students work on advanced railroad surveying and topographical surveying. This course must be preceded by Courses 3, 22 and 24. Students conditioned in any of these courses may be admitted at discretion of instructor. (At conclusion of third year of course.)

24. **DRAWING OF ENGINEERING STRUCTURES.** Five hours a week. (Second Term, third year, Course in Civil Engineering.)

CLAY WORKING AND CERAMICS

[Orton Hall, Rooms 18, 27, 26 and 25]

Professor Edward Orton, Jr., Mr. Bleininger

1. **CERAMIC CHEMISTRY.** This course is open only to those who have Completed General Chemistry 12. The student begins the quantitative analysis of salts and chemicals, and later works on limestone and other easy materials. Five times a week. (First Term, second year, Course in Ceramics and Short Course in Clay–working.)

2. Continuation of Course 1. The student begins the quantitative analysis of clays and complex minerals, working first on samples of known composition, and later on unknown materials. Five times a week. (Second Term, second year, Course in Ceramics and Short Course in Clay–working.)

3. Continuation of Course 2. The student completes the ultimate analysis of clays and begins the proximate "Rational" analysis of clays and pottery bodies, following the methods of Seger. Five times a week. (Third Term, second year, Course in Ceramics and Short Course in Clay–working.)

4. **LECTURES ON CLAY MANUFACTURE.** (supplemented by frequent recitations). The origin, composition and properties of clays and other minerals employed in the clay, glass and cement industries. Five times a week. (First Term, third year, Course in Ceramics; and second year, Short Course in Clay–working.)

5. Continuation of Course 4. A series of lectures, with recitations, on the general principles of the manufacture of bricks and the coarser clay wares, including the selection and winning of the materials, their preparation, manufacture, burning and testing. Five times a week. (Second Term, third year, Course in Ceramics; and, second year, Short Course in Clay–working.)

6. Continuation of Course 5. A series of lectures, with recitations, on the classification and manufacture of pottery and the finer grades of clay wares, including the selection of the materials, preparation of the bodies, manufacture of the ware, preparation of the glazes, burning and decoration of the wares and the pyrometry of ceramics. Five times a week. (Third term, third year, Course in Ceramics; and, second year, Short Course in Clay–working.)
Course in Ceramics; and, second year, Short Course in Clay–working.)

7. **CERAMIC CHEMISTRY.** Continuation of Course 3. Open only to those who have completed that course. The analysis of glasses and glazes, devoting special attention to the use of hydrofluoric acid in silicate analysis, and to the determination of lead and boracic acid. Five times a week. (Second term, third year, Course in Ceramics.)

9. **LABORATORY WORK IN CERAMICS.** Open only to those who have completed Courses 3 and 6. The student will undertake the production of such wares as are made from single clays; then wares made by blending two or more natural clays; and, then, such wares as are made from an artificial body. In each case the bodies made will be burnt and tested. Five times a week. (First Term, fourth year, Course in Ceramics.)

10. Continuation of Course 9. The student will practice on the production of glasses and glazes, beginning with the natural "slip glazes" and taking successively the soft raw-lead glazes, the fritted lead-boracic-acid glazes, and the hard-fibre leadless porcelain glazes. In each case the glazes will be made for use on some definite body, and will be made to "fit." Five times a week. (Second Term, fourth year, Course in Ceramics.)

11. Continuation of Course 10. The student will practice on the use of the coloring and opacifying oxides in glazes, and on the production of colors for the decoration of pottery, and of body-stains. Five times a week. (Third term, fourth year, Course in Ceramics.)

12. **LECTURES ON CEMENT MANUFACTURE.** The theory of hydraulicity, the compounding, manufacture and testing of natural and Portland cements and hydraulic silicates. Open to students who have had courses 3 and 6. Facilities for laboratory work in making, burning and testing cements will be given. Five times a week. (Second Term, fourth year, Course in Ceramics.)

14. **MINERAL REPORTS.** A series of lectures on the prospecting and opening of mineral properties and ceramic plants. Frequent trips will be made to the important clay-working centers of Ohio for field work and practice in observation. Students will be allowed to specialize along their intended lines. Five times a week. (Third Term, fourth year, Course in Ceramics.)

15. **THESIS.** As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of this study must lie within the field of the degree sought. The subject must be announced to the President of the University (dependent upon the approval of the head of the Department), not later than the beginning of the second term of the fourth year; and the completed thesis must be presented on standard paper of certain size and quality, type-written, bound, and titled, not later than the second Saturday before Commencement Day.

16. **GENERAL PRINCIPLES OF APPLIED CERAMICS.** A series of lectures on the chemical technology of the clay, glass and cement industries. Three times a week. (Third Term, fourth year, Course in Chemistry.)

17. **PRACTICE** in making drawings and specifications for brick kilns, brick dryers, pottery kilns, gas producers, glass pot-furnaces, glass tanks, cement kilns and burning cylinders. Students will be allowed to specialize along the lines they intend to follow. Four times a week. (Second Term, fourth year, Course in Ceramics.)

DOMESTIC ECONOMY

[Hayes Hall, Rooms 1, 3, 10.]

Associate Professor Bowman, Assistant Professor Souther

Domestic Science

1. **FOOD ECONOMICS.** One lecture and three laboratory periods each week. Four hours credit. Lectures embracing a study of the evolution of society as affected by food conditions; second, a study of food principles. Laboratory work includes experimental work with foods, and the preparation and serving of typical foods of certain classes. Offered in the first term of each year.

2. **FOOD ECONOMICS.** One lecture and three laboratory periods each week. Four hours credit. By lecture and research work, the relative nutritive and money values of foods are considered. Each student prepares a weekly dietary for the family; the amount to be expended limited by the instructor. United States Agricultural Bulletin standards used. Laboratory work is a continuation of Course 1. Offered in second term of each year.

3. **EMERGENCY WORK AND HOME NURSING.** One lecture and three laboratory periods each week. Four hours credit. The lectures, demonstrations and practical work are designed to set forth the principles underlying good nursing, to take up the dietetic treatment of various diseases and to consider such emergency cases as frequently require prompt treatment in the home. Food suitable for invalids, infants and convalescents is prepared in the laboratory. Offered in the third term of each year.

4*a*. **PRESERVATION OF FOODS.** Four weeks.

b. **HYGIENE OF CLOTHING.** Eight weeks.

One lecture and three laboratory periods each week. Four hours credit.

(*a*). Includes a brief study of the causes of decomposition, a history of the methods employed in the preservation of foods, and practical work in canning, preserving, etc.

(*b*). Includes a study of fibres and their proper treatment. The properties and cleansing effect of water and soap; disinfecting clothing; the chemical treatment of stains and demonstrated work in practical laundry methods. Offered in the first term.

10. **HOUSEHOLD ECONOMICS.** Two hours lecture course. Elective. A consideration of the best location for a house; its hygienic and sanitary construction and arrangement and approved methods of lighting, heating and ventilating. Offered in the third term of each year.

DOMESTIC ART.

5. **LECTURES** on the Industrial and Artistic Evolution of Society. History of the early race considered with special reference to the development in culture gained through hand-work. Practice work; Preparations of a series of models comprising the different stitches used in plain hand sewing; ornamental stitches and simple embroidery. One lecture and three practice periods each week. Four hours credit. Second term.

6. **LECTURES ON TEXTILES.** Study of fibres; their growth and the processes of manufacture. Comparative economic values of fabrics. Practice work; Machine and hand work on underwear; drafting from simple measurements; designing in pencil; use of patterns; making shirt waists or wash gowns; Simple straw hats and bows. One lecture and three practice periods a week. Four hours credit. First term.

7. **LECTURES ON HISTORIC COSTUME.** Consideration of line, form and color; hygienic and artistic dress; treatment of wool and silk fabrics. Practice work : Drafting patterns by use of Tailoring System. Cutting and fitting. Making wool dress. Making of hat frames, covering and trimming the same. One lecture and three practice periods a week. Four hours credit. First term.

8. **LECTURE AND PRACTICE WORK.** Continuation of Course 7. As much time as possible being given to pencil and water coloring designing of costumes and hats suitable to different wearers. Original designs required to be made and carried out in the case of each individual pupil. One lecture and three practice periods a week. Four hours credit. Second term.

9. **LECTURES ON HISTORY OF DOMESTIC ART AND ARCHITECTURE AND THE APPLICATION OF ART TO MODERN HOUSE DECORATION.** Practice work: Continuation of Course 8. Further work in practical costume making as may be designated by the instructor; the aim being to foster good taste and judgment in the use of expensive and inexpensive materials. Expressions of individuality encouraged but held subservient to general artistic principles, to rules of hygiene and to prevailing modes. One lecture and three hours practice work each week. Four hours credit. Third term.

Note. Individual instruction is given throughout. Pupils are required to furnish all materials except those used in making models of Course 5. A certain amount of work is required to be completed before admittance is given to the next higher grade of work.

DRAWING

[Hayes Hall, Rooms 22, 24 and 37]

Associate Professor Bradford, Assistant Professor French, Mr. Lewis

1. **FREEHAND DRAWING.** Practice and occasional lectures. Pencil, charcoal, pen and water-color drawing from copies, models and plaster casts.
   One drawing period a week, three terms, Industrial Arts.
   Two drawing periods a week, first term, Short Mining and Domestic Economy.
   Two drawing periods a week, first and second terms; all four-year Engineering Courses.
   Three drawing periods a week, three terms, Architecture.

2. **LETTERING.** Practice and occasional Lectures.
   Two drawing periods a week, third term, Industrial Arts, and Short Mining.
   Three drawing periods a week, third term, Ceramics, Civil, Electrical, Mechanical and Mine Engineering, and Architecture.
   This Course must be preceded by Course 1.

3. **MECHANICAL DRAWING.** Lectures or recitations one period a week. Practice two periods a week. All Engineering, Industrial Arts, Architecture. Subjects: Orthographic, Isometric and Oblique Projection and elementary Working Drawings. First term.
   Lectures or recitations two periods a week. Practice one period a week, in Industrial Arts and in all Engineering Courses except Civil Engineering; three periods a week in Civil Engineering and Architecture. Subject: Descriptive Geometry. Second term.
   Lectures or recitations, one period a week. Practice, two periods a week in Engineering Courses; four periods a week in Architecture. Subject: Shades, Shadows and Perspective. Third term, in all four-year Engineering and Industrial Arts Courses and the Course in Architecture. First term in the Short Mining and Domestic Science Courses.
   This Course must be preceded by Course 2.

4. **DRAUGHTING AND BLUE-PRINTING.** Practice and occasional Lectures. Three periods a week, second term. Arranged especially for the students in the Short Mining Course. This Course must be preceded by the first term of Course (3).

5. **TECHNICAL DRAWING.** Lectures and Practice. Rules and methods for working drawings, tracing, blue-printing, machine design and practice in making same to represent form and dimensions for shop use. Three periods a week. First term, Mechanical and Electrical Engineering Courses. This Course must be preceded by Courses (2) and (3).

7. **PHOTOGRAPHY.** Lectures and Practice. Lectures: Optics of Photography, chemistry of photography, exposing and developing, printing, lantern slides, orthochromatic photography and some of the applications of photography. Practice in outdoor, interior, instantaneous and flash-light photography, copying, lantern slides, and printing. Two periods a week. Ceramics, Architecture, first term. Civil, Mechanical and Mine Engineering, third term. The first term of this Course is elective.

8. **MECHANICAL DRAWING.** Lectures and Practice. Geometric and Projection Drawing. Two periods a week, first and second terms, Industrial Arts.

10. **MECHANICAL DRAWING.** Lectures and Practice. Arranged especially for the students in Agriculture. Two periods a week, first term.

11. **MECHANICAL DRAWING.** Lectures and Practice. Arranged especially for the students in Short Course in Ceramics, five periods a week, third term.

12. **CLAY MODELING.** Modeling in Clay and Casting in Plaster, ornamental forms from designs, photographs, nature and original designs. Two periods a week; first, second and third terms.
This Course must be preceded by Course (1).
Domestic Economy Course, second term. Architectural Course, second and third terms. This Course must be preceded by Course (1).

13. **TECHNICAL AND DECORATIVE DESIGN.** Lectures and Practice. Lectures on the principles of decorative design in monochrome, color and relief, and practice in the same. Two periods a week; first, second and third terms.

14. **PEN DRAWING.** Two periods a week, first term. Arranged especially for the Course in Architecture. This Course must be preceded by Course (1).

15. **TECHNICAL DRAWING.** Lectures and Practice. House Designing. Five periods a week, third term. Domestic Economy.

16. **LECTURES AND PRACTICE.** Technical Drawing consisting of the designing and preparation of specifications of structures related to agriculture. Three periods a week, third term.

ART.

An elective course in Art offered by Department of Drawing. Must be preceded by Course 1 in Drawing or its equivalent elsewhere.

17. **LECTURES AND PRACTICE.** Lectures on color standards, color theory, color harmony, color appearances, tone and gradation, atmosphere and values. Practice in color work either water or oil color. First term. Lectures illustrated by lantern slides.

18. **LECTURES AND PRACTICE.** Lectures on objects of art, ideas and subjects, style and individuality, schools of art, great artists including old and modern masters. Illustrated by lantern slides. Practice in water or oil painting from still life. Second term.

19. **LECTURES AND PRACTICE.** Lectures will be a continuation of second term's work and including sculpture and the master sculptors. Illustrated by lantern slides. Practice in water or oil painting from life and nature or clay modeling. Third term. The above is to be offered as an elective for two or three hours as follows: Lecture for one hour and practice for two or four hours as the student has time.

ARCHITECTURE.

4. **SPECIFICATIONS.** Lectures and practice in preparing Specifications for Architectural Structures. Two periods a week. (Second Term; fourth year, Course in Architecture.)
5. **DECORATION AND ORNAMENT.** Lectures on the different styles of carved ornament and decorative color. The practice part of this subject will be incorporated in the clay Modeling and Designing. Three periods a week. (First Term, third year, Course in Architecture.)
6. **ESTIMATES AND SUPERINTENDENCE.** Lectures and practice in preparing estimates for structures designed in Courses 8, 11, 12 and 13, and the duties of superintendence. Four periods a week. (Third Term, fourth year, Course in Architecture.)
7. **HEATING, VENTILATING AND PLUMBING.** Lectures and experimental work. Lectures on the principles and methods of heating and ventilating and sanitary plumbing. Experimental work is carried on with the heating and ventilating plants in the different University buildings. Five periods a week. (Second Term, fourth year, Course in Architecture.)
8. **DESIGNING.** Lectures and Practice. Steel skeleton and fire proof construction. Five periods a week. (Second Term, fourth year, Course in Architecture.)
9. **HISTORY OF ARCHITECTURE.** Lectures illustrated by lantern slides. Three periods a week. (First Term, second year, Course in Architecture.)
10. Same as 9. (Second Term, second year, Course in Architecture.)
11. Same as 10. (Third Term, second year, Course in Architecture.)
12. **ARCHITECTURAL DRAWING.** Drawing architectural ornament, details of orders and styles with the special object of impressing upon the student's mind the archictectural characteristics considered in Course 9. Two periods a week. (First Term, second year, Course in Architecture.)
13. Same as 12. (Second Term, second year, Course in Architecture.)
14. Same as 12. (Third Term, second year, Course in Architecture.)
15. **DESIGNING.** Lectures and practice in designing structures adapted to modern requirements. Four periods a week. (First Term, third year, Course in Architecture.
16. **DESIGNING.** Lectures and practice. Two periods a week. (Second Term, third year, Course in Architecture.)
17. **DESIGNING.** Lectures and practice. Four periods a week. (Third Term, third year, Course in Architecture.)
18. **DESIGNING.** Four periods a week. (First Term, fourth year, Course in Architecture.)
19. **DESIGNING.** Four periods a week. (Third Term, fourth year, Course in Architecture.)
20. **THESIS.** Original design, to be accompanied with written description, specifications and estimate. Five periods a week. (Third Term, fourth year, Course in Architecture.)

ECONOMICS AND SOCIOLOGY

[University Hall, Rooms 17 and 18]

Associate Professor Clark.

Course 51 or Course 52 must precede all other Courses.

FIRST SEMESTER

51. **ELEMENTS OF POLITICAL ECONOMY.** A careful study of the laws of production, exchange, distribution and consumption of wealth; combined with an analysis of the industrial actions of men as regards land, labor, capital, money, credit, rent, interest, wages, etc. Text-book, lectures and individual investigations. Four times a week. This Course is repeated in the Second Semester (as Course 52). Students who are required to take the subject, those whose names begin with the letters L to Z will take it in the First Semester; others will take it in the Second Semester (as Course 52).

53. **THE HISTORY OF INDUSTRIAL SOCIETY.** A general view of the evolution of industrial society; and a study of causes and effects of past economic policies together with their bearing on existing conditions; with special reference to England and America. Lectures and assigned readings. Twice a week.

55. **PRACTICAL PROBLEMS IN ECONOMICS.** A rapid study of immigration, money, railroads, crises and tariff. Lectures and collateral readings. Twice a week.

57. **THE TRANSPORTATION PROBLEM.** A study of the development and present economic status of roads, canals and railroads in their relation to industry and to the state. Lectures. Twice a week.
Not offered in 1899–00.

59. **PUBLIC FINANCE AND TAXATION.** This course aims to make the student acquainted with the theory of public revenue and expenditure; and with the leading systems of financial administration throughout the world. Municipal indebtedness and corporate financiering are incidentally treated. Text-book and lectures. Twice a week.
Not offered in 1899–00.

61. **SEMINARY IN ECONOMICS.** Two hours a week at one meeting. All students who elect their Major Study in Economics must take this course in their fourth year. Open, as elective, to other students, graduate and advanced under-graduate, on permission of the instructor.

63. **SOCIOLOGY AND STATISTICS.** Lectures and laboratory work. One hour credit. This course may accompany courses 55, 57, 59 or 65.

65. **COMMERCIAL GEOGRAPHY.** A scientific study of business relations and conditions, domestic and foreign; the sources, quantity and quality of products, and the distribution of the same; trade routes and the means of communication. The Consular Reports will constitute one basis of study. Texts and lectures.

SECOND SEMESTER

52. **ELEMENTS OF POLITICAL ECONOMY.** Text-book, lectures and individual investigations. Four times a week. (This is a repetition of Course 51, and will be taken in the Second Semester by those students (of whom it is required) whose names begin with the letters A to K.)

53. **THE HISTORY AND THEORY OF SOCIALISM.** Lectures and collateral readings. Twice a week.

56. **INDUSTRIAL AND SOCIAL REFORMS.** A study of labor problems, charities and corrections, monopolies, insurance, trusts, etc. Lectures and collateral readings. Twice a week.

58. **MONEY, CREDIT AND BANKING.** This course involves the history and theory of the subject; a comparative study of monetary systems, currency, etc.; together with various methods of banking; national banks, clearing houses, sub-treasury, etc.; and a critical analysis of proposals for reform. Texts, lectures and collateral readings. Twice a week.
Not offered in 1899-00.

60. **INDUSTRIAL AND FINANCIAL HISTORY OF THE UNITED STATES.** A complete survey of American industries; financial resources and policies; public lands, government subsidies, internal revenue, etc.; history and description of the Treasury and Interior Departments, the Mints, etc. Lectures and collateral readings. Twice a week.

62. **SEMINARY IN ECONOMICS.** Two hours a week at one meeting. This is a continuation of Course 61, and is open only to those who have had that course. All students who elect their Major Study in Economics must take this Course in their fourth year. Open, as elective, to other students, graduate and advanced under-graduate, on permission of the instructor.

64. **SOCIOLOGY AND STATISTICS.** A continuation of Course 63. One hour credit. May be taken separately or accompany Courses 56, 58, 60 or 66.
Courses 1 and 2 in the College of Agriculture and Domestic Science are the same as Courses 51 and 52 described above.

66. **COMMERCE AND TRADE.** Theory and practice of business. Standard business forms, commercial paper, stocks and bonds, insurance policies and investment securities of all kinds will be studied with the aid of sample copies. This is an advanced course and should be preceded by four elective courses in the department including Course 60. Required readings and reports on current commercial and financial literature. Lectures.

EDUCATION

[University Hall, Rooms 51 and 54]

Professor Gordy, Mr. Hamilton.

FIRST SEMESTER

51. **ELEMENTARY EDUCATIONAL PSYCHOLOGY.** This course is intended to be helpto three classes of students: (1) Those who are not preparing to teach, but who wish to make some study of education in order that they may perform their duties as members of society more intelligently: (2) Those intending to teach and who wish to study the relations between Psychology and education; and (3) Those preparing to be superintendents and who wish to get suggestions as to the best method of teaching Psychology to teachers. The text used is Gordy's Psychology. Students will be required to do collateral reading and bring in reports of their work. Four hours a week.

53. **HISTORY OF GREEK EDUCATION.** Students of this course will make a study of the history of the education of the Greeks from the time when life was their only school to the time when Greece became the teacher of the world. The connection between Greek life and Greek education will be sharply emphasized; the defects of Greek ideals of life will be shown as reappearing in Greek ideals and methods of education, and these in turn as exerting an influence on Greek life. This course will be essentially a study of Greek civilization, but with the practical purpose of getting light for the solution of our own problems. It is believed that the course will be especially helpful to those preparing to teach history, and the classics. The texts used are Davidson's *Greek Education*, and Davidson's *Aristotle*. Readings are required of students in Greek history and Plato's *Dialogues*. Four hours a week.

55. **THE HERBARTIAN PEDAGOGY.** The object of this course is three-fold: (1) To ascertain what the Herbartian Pedagogy is: (2) To determine its truth, and (3) To consider carefully its applicability—so far as it is true—to the schools of this country. Special attention will be given to these Herbartian theories that are most widely current in this country. The texts used are Herbart's *Science of Education*, De Garmo's *Herbart* and Lange's *Apperception*. Four hours a week.

59. **CHILD STUDY.** An elementary course in the growth and development of children, giving special attention to the pedagogical aspect of the subject. Though arranged primarily for teachers this course treats of subjects of universal interest such as the child as a social factor, function of play, the child and self-government, the child and the race, etc. Open to all students. Twice a week.

67. **EDUCATIONAL VALUES.** This course seeks to determine the capacity of the various subjects pursued in elementary and secondary courses to contribute to true educational ideals. The work is based on Fouillie's *Education from a National Standpoint*. Twice a week.

69. **A STUDY OF SCIENTIFIC METHOD;** intended especially for those preparing to teach Science. Twice a week.

71. **PEDAGOGICAL RESEARCH.** For teachers and advanced students. Various school problems will be taken up for exhaustive study, thus offering opportunity for an insight into the organization of the school not usually open to undergraduate students. The work will be by topics and largely individual. Special facilities for original investigation will be at the command of students showing themselves competent to do such work. As only a small number of students can be accommodated applications for admission should be made as soon as possible. Twice a week.

73. **MODERN EDUCATIONAL SYSTEMS OF EUROPE.** A brief historical and statistical study of secondary education in Germany, France and England. The work will be based upon such texts as Russel's *German Higher Schools*, Holman's *English National Education*, and will consist of recitations and reports upon original topics. Open to all students. Twice a week.

SECOND SEMESTER

52. **MODERN EDUCATIONAL THEORIES.** These theories will be studied from three points of view: (1) As the expression of a certain philosophy of life; (2) from the point of view of their consistency; and (3) from that of their truth. The work is based on Quick's *Educational Reformers*. Twice a week.

54. **PLATO'S REPUBLIC.** This course is essentially seminary work for the benefit of those students of Course 53 who wish to make a critical study of Plato's *Philosophy of Education*. Twice a week.

56. **THE KINDERGARTEN.** This course is intended especially for those who are preparing to do kindergarten and primary work, and to be superintendents of schools. Twice a week.

58. **THE PHILOSOPHY OF EDUCATION.** This course aims to make a systematic exposition of the philosophy of education. Four times a week.

60. **EDUCATION IN THE UNITED STATES.** A comparative study of secondary education in the United States and Europe presupposing Course 73. Twice a week.

68. A continuation of 67. Twice a week.

70. A continuation of 69. Twice a week.

72. **PEDAGOGICAL RESEARCH.** Continuation of Course 71. Open to students credited with 59 or 71. Twice a week.

ELECTRICAL ENGINEERING.

[Electrical Hall, Room 9 and Laboratory.]

Associate Professor Caldwell, Mr. Fish

6. **ELECTRICAL ENGINEERING.** Lectures on direct and alternating circuits, dynamo machinery, transformers, accumulators and applications. Twice a week. (First and Second Terms, third year, Course in Architecture; and fourth year, Courses in Industrial Arts and Manual Training.)

7. **ELECTRICAL ENGINEERING.** Laboratory work on the subjects treated in Course 6, which it accompanies. Twice a week. (First and Second Terms, fourth year, Courses in Industrial Arts, Manual Training, Mining and Mechanical Engineering; Second Term, third year, Course in Architecture; fourth year, Civil Engineering.)

8. **DIRECT CURRENT DYNAMO MACHINERY.** Generators and Motors, their theory, construction and operation. Lectures, recitations and problems. Four times a week. (Second Term, third year, Course in Electrical Engineering.)

9. **ELEMENTARY DYNAMO LABORATORY.** Handling and testing of circuits, generators, motors, accumulators, lamps, etc. Nine actual hours per week. (Third Term, third year, Course in Electrical Engineering.)

10. **ALTERNATING CURRENT CIRCUITS AND MACHINERY.** Generators, transformers, single and polyphase motors, apparatus and systems. Lectures, recitations and problems. Three times per week. (First and Second Terms, fourth year, Course in Electrical Engineering.)

11. **ADVANCED DYNAMO LABORATORY.** Continuation of the work begun in Course 12, together with alternate current apparatus, telephone apparatus, etc. (First and Second Terms, six actual hours. Third Term, with thesis work nine actual hours. Fourth year, Course in Electrical Engineering.)

12. **ELECTRICAL TRANSMISSION AND DISTRIBUTION.** Systems, operation and apparatus. Twice a week. (Second Term, fourth year, Course in Electrical Engineering.)

13. **APPLICATION OF ELECTRICITY.** Brief treatment of the elements of Illumination, Street Railway Work, Telephone, Telegraph, Electro-metallurgy, Mining, etc. The seminary method is used in this course to the extent of each student writing one paper on some assigned subject, and reading the same before the class. Five times per week. (Third Term, fourth year, Course in Electrical Engineering.)

14. **ELECTRICAL DESIGN.** Includes wiring of buildings, Direct and Alternate current generators, transformers, distribution, etc. Eight hours per week in the drawing room. (Second and Third Terms, fourth year, Course in Electrical Engineering.)

ENGLISH LITERATURE

[University Hall, Room 31.]

Professor Barrows, Assistant Professor Taylor

All Courses except 51 and 52 are elective; but no elective is open to one who has not taken, or is not taking 51 or 52. Students, whose major study is in English literature must take 69 and 70, in either the third or fourth year. Biennial courses will alternate as follows: 53 with 61, 54 with 60, 63 with 71, 64 with 72.

FIRST SEMESTER.

51. **AN INTRODUCTION TO ENGLISH LITERATURE.** Four times a week.
Required in the Course of Arts, the Latin Course in Philosophy, and the Course preparatory to the study of Law and Journalism.
Course 51 includes (1) an outline of the history of English literature. For this part of the work Pancoast's "Introduction to English Literature" is covered in three examinations. (2) Lectures on the elements of literary analysis and interpretation. (3) Study of selections characteristic of different authors and of different periods, to secure acquaintance with literary problems, to cultivate perception of literary qualities, and to verify and apply the assertions of the lectures and of the manual. The book first used is Palgrave's "Golden Treasury."

53. **POETRY, FROM SPENCER TO MILTON,** exclusive of the drama. Twice a week. (Omitted in 1899–1900.) Historical and critical lectures; papers and discussions. Required books: "Spenser's Faery Queene" (Kitchin); "Elizabethan Lyrics" (Schilling): "Milton's Poetical Works."

55*a*. **THE ENGLISH BIBLE.** The Pentateuch. Once a week. Given in 1901–'02.

55*b*. **THE ENGLISH BIBLE.** The Histories. Once a week. Given in 1899–1900.

55*c*. **THE ENGLISH BIBLE.** The Gospels. Once a week. Given in 1900–1901.

The study of the Bible is continued through three years. The old authorized version is the text-book; but students must also have, for correction and comment, the revised version.

57. **SHAKSPERE.** Three times a week. Literary study of Shakspere's plays, with no more reference to historical and philological matters than is necessary to an understanding of the text. Various problems of dramatic art are discussed in connection with the plays that best illustrate them.

59. **THE MODERN NOVEL.** Three times a week. (Omitted in 1900–1901.) Lectures, reading and reports.

61. **FROM DRYDEN TO JOHNSON.** Twice a week. (Omitted in 1900–1901.) Lectures, reading and reports. Both prose and poetry will be reviewed in this course.

63. **PROSE, FROM COWPER TO THE VICTORIAN PERIOD.** Three times a week. (Omitted in 1899–1900.) Lectures on the history of thought in this period, on the relations of authors to each other and to the times, and on their literary significance. Critical study of selections from Burke, Coleridge, Landor and the essayists.

65. **MASTERPIECES: A STUDY OF LITERARY TYPES.** Three times a week. This with course 66 constitutes one continuous course. The course covers the whole field of English Literature topically. It is designed for graduates, but is open to undergraduates who have taken two elective courses in this department. The study is of literary types, their origin and development, the best examples in English being chosen for basis; the types will include the drama, the epic, the idyll, the lyric, and in prose the novel, the short story and the essay. The whole will be based upon Aristotle's "Poetics" and the theory of ideal literature; and will include lectures, readings and essays.

67. **CHAUCER.** Twice a week. The Prologue to the Canterbury Tales, and the most important of the tales will be read. The Morris-Skeat edition of the Prologue, and Skeat's edition of Chaucer's Works are required.

69. **LITERARY PROBLEMS.** Twice a week. A series of topical studies. Lectures and illustrative readings drawn from the entire range of our literature; reports and discussions.

Required in the third or fourth year of students whose major study lies in this department.

71. **VICTORIAN LITERATURE — PROSE.** Three times a week. (Omitted in 1900–1901.) Victorian prose, centering on the essayists,—Ruskin, Newman, Arnold, Pater, Stevenson, Lectures, readings and reports.

SECOND SEMESTER.

52. **AN INTRODUCTION TO ENGLISH LITERATURE.** Four times a week.

Required in the Modern Language and English Courses in Philosophy and in the Course in Commerce and Administration. See description of Course 51, of which this is a repetition.

54. **PROSE. FROM SIDNEY TO MILTON.** Twice a week. (Omitted in 1899–1900.) Lectures on the intellectual life, and the political, religious, and social problems of the period as they affected its literature; papers and discussions. Required books: Bacon's "Essays and Advancement of Learning" (Selby); Browne's "Religio Medici" (Camelot Classics); Cowley's "Essays" (Cassel's National Library); Fuller's "Wit and Wisdom" (R. T. S. Library). Sidney, Taylor and others will be investigated in the library.

56*a*. **THE ENGLISH BIBLE.** Course 55*a* continued. Given 1901–1902.

56*b*. **THE ENGLISH BIBLE.** The Psalms and Prophets. Once a week. Given in 1899–1900.

56*c*. **THE ENGLISH BIBLE.** The Acts and Epistles. Once a week. Given in 1900–1901.

The study of the Bible is continued through three years. The old authorized version is the text-book; but students must also have, for correction and comment, the revised version.

58. **THE DRAMA — FROM THE MIRACLE PLAYS TO THE CLOSING OF THE THEATRES.** Three times a week. Lectures on the Mysteries, the Moralities, the Interludes, the Rise of the Regular Drama, Shakspere and his Predecessors, Contemporaries and Successors. Select plays will be read by the class.

60. **THE DR MA — SINCE THE RESTORATION.** Twice a week. (Omitted 1900–1901.) Lectures, readings and reports.

62. **AMERICAN AUTHORS.** Three times a week. (Omitted 1900–1901.) Lectures, readings and reports.

64. **POETRY — FROM COWPER TO THE VICTORIAN PERIOD.** Three times a week. (Omitted in 1899–1900.) Lectures on the rise of the romantic spirit, on the history of thought in this period, and on the relation of the poets of the times and to current problems. Study of selections from Cowper, Burns, Wordsworth, Shelley and Keats.

66. **MASTERPIECES: A STUDY OF LITERARY TYPES.** Three times a week. Course 66 is a continuation of Course 65 and must be preceded by 65. See description of Course 65.

68. **THE GREAT TRANSLATIONS.** Twice a week. (Omitted in 1899–1900.) This is a graduate course, for the discussion of various problems of universal literature, and the investigation of the indebtedness of English to other literatures. Undergraduates must obtain permission to take this course.

70. **LITERARY PROBLEMS.** Twice a week. A continuation of Course 69, and required of students whose major study lies in this department.

72. **VICTORIAN LITERATURE — POETRY.** Three times a week. (Omitted 1900–1901.)

ENTOMOLOGY

(*See* Zoology and Entomology)

EUROPEAN HISTORY

(*See* History)

GENERAL CHEMISTRY

(*See* Chemistry)

GEOLOGY

[Orton Hall, Rooms 1, 5, 4, 7 and 13]

Professor Orton, Associate Professor Prosser, Associate Professor Bownocker.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE.

FIRST SEMESTER.

53. **PALEONTOLOGY.** Careful training in systematic classification which may be used in the philisophical study of the development of plant and animal life, or as a means of becoming acquainted with the faunas and floras that characterize the various geological formations.

At first the student devotes some time to conchology, studying recent shells in which the characters used in classification are well preserved, and after this preliminary work, fossils are studied. Fossils afford the most reliable data for identifying and correlating geologic formations, and the critical study of faunas is a field especially adapted to independent research.

Laboratory, museum and field work. Two to five hours credit.

55. **PETROGRAPHY 1.** Laboratory and Lectures. Optical crystallography, with practical determination of rock-forming minerals, macroscopically and microscopically. Study of the igneous rocks in the hand specimen and thin section. Twice a week. The Sturtz rock collection and Voight Hochgesang thin sections of typical minerals and rocks will be carefully studied. Books of reference:—Mitchel Levy—*Les Minneaux des Roches;* Rosenbusch—*Mikroscopische Physiographie der Petrographisch Wichtigen Mineralien*, 3d ed.; *Mikroscopische Physiographie der Massigen Gesteine*, 2d ed.; Teall's *British Petography;* Spottiswoode's *Polarization of Light.* Prerequisites; Chemistry, 51 and 52; Metallurgy, 52 (Mineralogy and Crystallography).

59. **FIELD GEOLOGY.** Field and laboratory study of the geological formations readily accessible from Columbus. This course is intended to acquaint the student with the ordinary methods of field investigation, and involves the collection and identification of specimens, the measurement of geologic sections and the preparation of a report describing the region studied. Two to five hours credit.

61. **COSMICAL GEOLOGY.** Lithological Geology, Dynamic and Structural Geology. Books of reference used in preparation of the work: Green's Physical Geology, Geike's Text-book of Geology, LeConte's Elements of Geology, Hunt's Chemical Geology, Daubree's Geologic Experimentale. Three times a week.

63. **PHYSIOGRAPHY.** Study of the features of the earth's surface with special reference to North America; the agencies producing these features and geographical changes now in progress. Recitations, lectures, map-work, field excursions. Books used in preparation of work: Standard Works on Physical Geography; Russel's Rivers of North America; Lakes of North America; and Glaciers of North America; Shaler's Aspect of the Earth; Wright's The Ice Age of North America; The National Geographic Magazine; Maps of the Mississippi River Commission, etc. Twice a week.

SECOND SEMESTER.

54. Continuation of Course 53. These two Courses may be continued through a second year.

56. Continuation of Course 55. Twice a week.

58. **GEOGRAPHIC GEOLOGY.** The origin, development and destruction of topographic forms. Rivers, lakes, oceans, ice, and winds as agents modifying the surface of the earth. The great ice age in North America. [Primarily for teachers.]

Books of reference: Journal of Geology; American Geologist; The Great Ice Age; (Geike's) The Ice Age in North America; (Wright) The Reports of the United States Geological Survey; The Maps of the Mississippi River Commission, etc. Three hours per week. Lectures, recitations, map work. Third term.

60. **AREAL GEOLOGY.** Instruction in the methods of preparing geological maps and reports. The student compiles from a geological report a map with sections showing geologic structure, and later traces the outcrops and prepares a geological map of some region. Two to five hours credit.

62. **HISTORICAL GEOLOGY.** A general course in paleontological and stratigraphical geology with excursions and laboratory study of the Ohio Geological Reports and characteristic fossils. The development of organisms and the classification and distribution of the geological formations are considered. Continuation of Course 61. Lectures and recitations three hours.

64. Continuation of Course 63. Twice a week.

COLLEGES OF AGRICULTURE, ENGINEERING AND PHARMACY.

2. **GENERAL GEOLOGY.** Structural, historical and dynamical geology. Three hours lectures and recitations and four laboratory and field work. In the laboratory. Dana's Manual of Geology, the Ohio Geological Reports and characteristic fossils will be studied. In the field, specimens will be collected, sections measured, formations identified and the student will be given an idea of the methods of work pursued by a field geologist. Credit five hours. First term.

5. **ECONOMIC GEOLOGY.** The common minerals and rocks composing the earth's crust, their alteration and decomposition. Soils, their origin and classification; the soils of the United States and especially those of Ohio. Fuels: Coal, oil and gas. Building stones, limes and cements. Iron and the most useful metals. Three hours. Second term. Lectures and laboratory work.

1. **PHYSIOGRAPHY.** The probable origin of the earth and its relation to other heavenly bodies. The features of the earth's surface and the agencies producing these. The atmosphere, climate, etc. Oceans, rivers and lakes. Recitations, lectures and map work. Five hours. Third term.

5. **GENERAL GEOLOGY.** Structural, Historical and Dynamical Geology. Three hours lectures and recitations and two hours laboratory and field work. In the laboratory the Ohio Geological Reports and characteristic fossils will be studied. In the field, sections will be measured, formations identified, specimens collected and the student given an idea of the method of work pursued by a field geologist. (Required in the first and second term of fourth year in the Long Course.)

6. **ECONOMIC GEOLOGY.** Lectures, Economic materials of stratified rocks, clay, limes, cements, coals, iron ores, phosphates, petroleum, etc. Economic materials derived from veins and igneous rocks, gold, silver, copper, mercury. Gems. Books of reference used by students in preparation of their work: Publications of U. S. Geological Survey, State Geological Surveys, Phillips' Ore Mining. Three times a week. (Required in second term of fourth year in Long Course.)

1. **PHYSIOGRAPHY.** Recitations, lectures, map work. The probable origin of the earth and its relations to other heavenly bodies. The features of the earth's surface and the agencies producing these. The atmosphere, climate, etc. Oceans, rivers and lakes. Five hours. Third term, first year. Short Courses in Mining, Clay-working; and second year, Short Course in Industrial Arts.

4. **ELEMENTARY GEOLOGY.** Recitations, lectures, laboratory work. Lithological, dynamical, structural and historical geology. Five hours. (Second term, second year, Short Course in Mining.)

5. **GENERAL GEOLOGY.** Structural, historical and dynamical geology. Three hours lectures and recitations and four hours laboratory and field work. In the laboratory Dana's Manual of Geology, the Ohio Geological Reports and characteristic fossils will be studied. In the field specimens will be collected, sections measured, formations identified and the student given an idea of the methods of work pursued by a field geologist. Credit five hours (First term, fourth year, Course in Architecture, Ceramics, Civil and Mining Engineering; and second year, Short Course in Clay-working.)

6. **ECONOMIC GEOLOGY.** Lectures and assigned reading. Economic materials of stratified rocks, clays, limes, cements, coals, iron ores, phosphates, petroleum and gas. Economic materials derived from unstratified rocks—gold, silver, copper, mercury, etc. Three hours. (Second Term, fourth year, Courses in Architecture, Ceramics, Civil and Mining Engineering; and second year, Short Course in Clay-working.)

7. **PETROGRAPHY.** Lectures and laboratory work. The ingenious, sedimentary, and metamorphic rocks,—their origin and classification. The volcanic rocks of the western United States,—their composition, structure and alteration products. The object of this course is to give the student a practical acquaintance with rocks. Two hours. (Second Term, fourth year, Course in Mining Engineering.)

GERMAN LANGUAGES AND LITERATURES

[University Hall, Rooms 32 and 33]

Professor Eggers, Associate Professor Mesloh

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

FIRST SEMESTER

51. **ELEMENTARY GERMAN.** Four times a week.

53. **SCIENCE READING.** Twice a week.

55. **INTERMEDIATE GERMAN.** Lectures upon outline of German Literatrue. Reading of selections. Four times a week.

57. **THE GERMAN DRAMA.** Lectures and reading of Selections. Three times a week.

59. **FAUST I.** Twice a week. (Can be taken only by those who propose to take 60.)

61. **MIDDLE HIGH GERMAN.** Mediæval Epics. Twice a week.

63. **DEUTSCHER AUFSATZ.** Original compositions in German. Once a week.

65. **COLLOQUIAL EXERCISES.** For advanced students. Twice a week.

67. **GOTHIC.** Wright's Primer. The relation between Gothic and allied languages will be considered. Twice a week.

59. **OLD NORSE.** Lectures on Grammar and Reading of Sagas.
The last two courses will alternate.

71. **SANSKRIT.** Perry's *Primer.* Lectures introductory to the study of Indo-Germanic philology.

73. **MODERN GERMAN DRAMA.** Critical study of contemporary dramatists, Hauptmann, Sudermann and others, with references also to the dramas of Ibsen and other dramatists of Germanic countries. Lectures and reading. Composition. After 1901 this course will alternate with 57. Three hours a week.

75. **PHONETICS.** Lectures. The course is intended to give the student a knowledge of the various sounds of language and of the relations between them. One hour a week.

SECOND SEMESTER

52. Continuation of Course 51. Four times a week.

54. Continuation of Course 53. Twice a week. Courses 53 and 54 must have been preceded by Courses 51 and 52.

56. **GERMAN LITERATURE.** Lectures and reading of Selections. Four times a week. Course 55 must have been preceded by Courses 51 and 52.

58. **THE GERMAN PROSE.** Lectures and reading of Selections. Three times a week. 57 and 58 must have been preceded by 51, 52, 55 and 56.

60. **FAUST II.** Twice a week.

62. **MEDIÆVAL LYRICS.** Twice a week.

64. **DEUTSCHE KULTURGESCHICHTE.** Once a week.
Courses 59, 60, 61, 62, 63 and 64 can be taken only with the approval of Professor Eggers; and must have been preceded by Courses 51, 52, 55 and 56, or their equivalents.

66. **COLLOQUIAL EXERCISES.** For advanced students. Twice a week.

68. **OLD HIGH GERMAN.** Lectures on Grammar and Literature. Reading of Selections. Twice a week.

70. **COMPARATIVE GRAMMAR.** Lectures. Twice a week.
The last two courses will alternate.

72. Continuation of Course 71.

74. **MODERN GERMAN PROSE.** Lectures and reading. The great contemporary writers of prose in Germany will be discussed. Some of their critical and philosophical works will be read. References will be made to the great prosaists of other Germanic countries. This course will alternate after 1901 with 58. Three hours a week.

COLLEGE OF AGRICULTURE, ENGINEERING AND PHARMACY

1. **ELEMENTARY.** Four times a week, through the year.

2. **SCIENCE READING.** Twice a week, through the year.

4. **GERMAN LITERATURE.** Four times a week, through the year.

5. **SCIENCE READING.** Four times a week. Open to those who have completed Course 1 or its equivalent. Required of all students who offer German as their entrance language.

GREEK LANGUAGE AND LITERATURE

[University Hall, Room 37]

Prrofessor Smith, Associate Professor Hodgman

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

ELEMENTARY GREEK. White's *First Greek Book* and one or two books of Xenophon's *Anabasis*. This course is designed to meet, partially, the wants of those who are deficient in the Greek required for admission. It cannot receive University credit. Five times a week, through the year.

FIRST SEMESTER

51. **XENOPHON'S HELLENICA.** Books I, II (Manatt). Greek Prose Composition. Herodotus, Book VII. Four times a week.

53. **LYSIAS,** Select Orations (Morgan.) Attic Antiquities. Homer's *Iliad* (Seymour). Four times a week

59. **LECTURES ON HISTORY OF ANCIENT ART.** Twice a week.
(Given biennially. Not offered in 1900–1901.)

61. **THE ATTIC DRAMA.** Lectures, collateral readings and quiz. Twice a week.

63. **LECTURES ON THE HISTORY OF MEDIÆVAL AND MODERN ART.** Twice a week.
(Given biennially. Not offered in 1901–1902.)

65. **LYRIC POETRY.** Selections from the Greek Lyric Poets. Twice a week.

SECOND SEMESTER

52. **HERODOTUS** (continued). Myers's History of Greece. Homer's *Odyssey* (Perrin). Four times a week.

54. **HOMER'S ILIAD** (continued). Plato's *Apology of Socrates*, *Crito*, and selections from *Phaedo*. Four times a week.

60. **LECTURES ON HISTORY OF ANCIENT ART.** Continuation of Course 59. Twice a week.
(Given biennially. Not offered in 1900–1901.)

62. **THE ATTIC DRAMA.** Continuation of Course 61. Rapid reading of two or three plays. Twice a week.

64. **LECTURES ON MEDIÆVAL AND MODERN ART.** Continuation of Course 63, Twice a week.
(Given biennially. Not offered in 1901–1902.)

68. **GREEK PRIVATE LIFE.** Lectures, illustrated by photographs and lantern-slides. Twice a week.

CLASSICAL PHILOLOGY

Courses 69–70. **HISTORICAL GRAMMAR.** These courses include lectures upon such topics as: The Indo-European family of languages; alphabets and pronunciation of Greek and Latin; accent and its effects as seen in vowel weakening, syncopation, etc.; vowel graduation; inflection of noun and verb; Grimm's Law and the associated laws; the passage of Latin into French and thence into English, etc. The courses include, also, the study of selected inscriptions, of a portion of Quintilian, Book I, and assigned reading in such manuals as Giles's Comparative Philology, and Thompson's Palæography. Twice a week through two semesters.
(Given biennially. Not offered in 1901–1902.)

HISTORY

AMERICAN HISTORY

[University Hall, Rooms 27 and 18]

Professor Knight, Dr. J. B. Sanborn

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

Course 55 (or 56) must precede all other courses in American History. All students intending to take advanced courses in American History should take English History (European History 153 and 154, Department of European History) as early as possible in their course.

FIRST SEMESTER

55. **POLITICAL HISTORY OF THE UNITED STATES.** Lectures, text-books, prescribed readings and topical reports. Hart's Formation of the Union; Wilson's Division and Reunion. Four times a week. This course is repeated in the Second Semester (as Course 56). Of students who are required to take this subject, those whose names begin with the letters from A to K will take it in the first semester; others will take it in the second semester (as Course 56). Two sections.

61. Seminary for Research Work in American History and Political Science. Two hours a week (at one meeting).
In 1900–1901 all fourth year students, who elect their Major Study in the departments of American History and Political Science must take this course. Open, as elective, to other students, graduate and advanced undergraduate, on permission of the instructor.

63. **AMERICAN COLONIAL HISTORY.** The political and social development of the American Colonies, the growth of colonial self-government and of the idea of union. Lectures, assigned readings and special reports. Three times a week.
(Given biennially. Not offered in 1900–1901.)

65. **CONSTITUTIONAL AND POLITICAL HISTORY OF THE UNITED STATES.** 1850–1876. Secessions, Civil War and Reconstruction; a study of the causes and the effects of the downfall of slavery. Lectures and assigned readings. Three times a week.
Given biennially. Offered in 1900–1901.)

71. **HISTORICAL MATERIAL AND ITS USE.** Lectures on elementary historical bibliography and the use of American historical documents, with practical exercises. Especially designed for students intending to do advanced work in American history and political institutions. Once a week.

All students electing their Major Study in the department of American History and Political Science are expected to take this course in their third year. Open as elective to others on permission of the head of the department.

73. **TERRITORIAL DEVELOPMENT OF THE UNITED STATES.** 1789–1850. Growth of the United States, the acquisition and settlement of new territories, and the effect of those territories on the life of the nation. Lectures and assigned readings. Twice a week.

56. **POLITICAL HISTORY OF THE UNITED STATES.** Lectures, text-books, prescribed readings and topical reports. Hart's Formation of the Union; Wilson's Division and Reunion. Four times a week. (This is a repetition of Course 55 and will be taken in the second semester by those students (of whom it is required) whose names begin with letters from L to Z.) Two sections.

62. **SEMINARY FOR RESEARCH WORK IN AMERICAN HISTORY AND POLITICAL SCIENCE.** Two hours a week (at one meeting).

This is a continuation of Course 61, and is open to those only who have had Course 61. In 1900–1901 all fourth year students electing their Major Study in the department of American History and Political Science must take this course. Open, as elective, to other students, graduate and advanced undergraduates, on permission of the instructor.

64. **CONSTITUTIONAL AND POLITICAL HISTORY OF THE UNITED STATES.** The Formative Period, 1776–1815. An advanced course covering the organization and establishment of the United States as a nation. Lectures, assigned readings and special investigations. Three times a week.
(Given biennially. Not offered in 1900–1901.)

66. **AMERICAN DIPLOMATIC HISTORY.** History of the foreign relations, policy and treaties of the United States. Lectures and special investigations. Three times a week.
(Given biennially. Offered in 1900–1901.)

72. **TOPICAL RESEARCH IN AMERICAN HISTORY.** The preparation of special topics on the basis of the work of Course 71. Some special period of American History will be taken up each year. Once a week.

Open to those who have had Course 71. All students electing their major study in the department of American History and Political Science are expected to take this course in their third year.

74. **TERRITORIAL DEVELOPMENT OF THE UNITED STATES, 1850-1900.** A continuation of Course 73. Particular attention will be paid to the country west of the Mississippi, and to the growth of American interests in the Pacific. Lectures and assigned readings. Twice a week.

COLLEGE OF ENGINEERING

56. **POLITICAL HISTORY OF THE UNITED STATES.** Lectures, text-books and prescribed reading. Hart's *Formation of the Union;* Wilson's *Division and Reunion.* Two sections. Four times a week. (Last half Second Term and Third Term, third year, Courses in Industrial Arts and Manual Training.)

COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE

5. **POLITICAL HISTORY OF THE UNITED STATES.** Lectures, text-books and prescribed readings. Hart's *Formation of the Union;* Wilson's *Division and Reunion.* Four times a week during the first term and the first half of the second term. Two sections. The aim of this course is to give the student such knowledge of the political history of the United States as shall make for intelligent citizenship and a clearer understanding of current political conditions.

EUROPEAN HISTORY

[University Hall, Rooms 7, 17, 36]

Associate Professor Siebert

Courses 151 and 152, in the order named, must precede all other courses in European History, except Courses 153, 154 and 157.

FIRST SEMESTER

151. **GENERAL HISTORY OF EUROPE TO THE CLOSE OF THE MIDDLE AGES.** Lectures, text-book and collateral readings. Adams, Civilization during the Middle Ages. Three times a week. Two sections.

153. **POLITICAL AND CONSTITUTIONAL HISTORY OF ENGLAND TO THE ACCESSION OF THE STUARTS.** Lectures, text-book and assigned readings. Gardiner's Student's History of England. Three times a week.

155. **HISTORY OF EUROPE FROM 1789 TO 1815.** The French Revolution. Lectures, recitations and collateral reading. Stephen's Europe, 1718–1815. Three times a week.

157. **ROMAN HISTORY AND INSTJTUTIONS.** Lectures and text-book. Pelham, History of Rome. Twice a week.

159. **HISTORY OF EUROPEAN COLONIES.** A study of colonial development of Portugal, Spain, England, the Netherlands, France and Germany during the fifteenth, sixteenth and seventeenth centuries. Lectures, collateral readings and special reports. Twice a week.
Omitted in 1900–1901.

161. **HISTORY OF FRANCE TO THE MIDDLE OF THE EIGHTEENTH CENTURY.** Lectures, assigned readings and special reports. Given biennially. Omitted in 1900–1901.

SECOND SEMESTER

152. **GENERAL HISTORY OF EUROPE FROM THE MIDDLE AGES TO THE PRESENT TIME.** Lectures, text-book and collateral reading. Schwill's History of Modern Europe. Three times a week. Two sections.

154. **POLITICAL AND CONSTITUTIONAL HISTORY OF ENGLAND FROM THE ACCESSION OF THE STUARTS TO THE PRESENT TIME.** Lectures, text-book and assigned readings. Gardiner's Student's History of England. Three times a week.

156. **HISTORY OF EUROPE SINCE 1815.** Lectures, text-book and assigned readings. Fyffe's Modern Europe. Three times a week.

158 **HISTORY OF THE PERIOD OF THE PROTESTANT REFORMATION.** Lectures and text-book. Hauser's Era of the Reformation. Twice a week.

160. **HISTORY OF EUROPEAN COLONIES.** History of colonization by the important States of Europe during the eighteenth and nineteenth centuries. Lectures, collateral reading and special reports. Twice a week.
Omitted in 1900–1901.

162. **DOCUMENTARY AND BIBLIOGRAPHICAL STUDIES IN EUROPEAN HISTORY.** Lectures, readings and criticism of documents, and investigations. Given biennially.
Omitted in 1900–1901.

HORTICULTURE

[Horticultural Hall]

Professor Lazenby, Mr. Price.

1. **ELEMENTS OF HORTICULTURE.** Lectures, text-book and laboratory work in garden, orchard and green-house. A study of the principles of plant growth and culture, preparation of soil, drainage and irrigation, weeds and insects. Four times a week. First term.

a. **GREENHOUSE, CONSTRUCTION AND MANAGEMENT.** A study of the different types of plant houses, including methods of heating, ventilating and watering. The vegetable forcing house, and the crops grown therein. Lectures, recitations and laboratory work in greenhouse. Four times a week. Second term.

b. **PLANT PROPAGATION.** The theory and practice of multiplying plants by seeds, cuttings, divisions, layers, budding and grafting. A study of special garden crops, including fertilizers, tools and implements. Practice in transplanting, pollinating and the use of insecticides and fungicides. Lectures and laboratory work in garden and orchard. Four times a week. Third term.

5. **VARIETIES OF FRUIT.** A study of the history, characteristics, adaptation and general qualities of orchard and garden fruits, including their commercial and food value. Practice in judging and scoring apples, pears, peaches, grapes, citrous and nut fruits. Lectures, recitations and laboratory exercises. Four times a week. First term.

6. **PRINCIPLES OF FRUIT CULTURE.** A study of the location, tillage and fertilizing of fruit lands; the selection of varieties, laying out and planting of fruit grounds; the care of fruit plantations, including diseases, insects and fungi; spraying and the use of insecticides and fungicides; harvesting, preserving and marketing fruit. Lectures and recitations four times a week. Second term.

7. **SMALL FRUIT CULTURE.** A study of the varieties and methods of culture of the small or bush fruits. Practice in cross-pollinating, judging and scoring of small fruits; the relation of bees and birds to horticulture; insect enemies; fungus diseases and the theory and practice of spraying. Lectures, recitations and laboratory work in garden and orchard. Four times a week. First term.

8. **ELEMENTS OF FLORICULTURE.** A study of the origin, history, classification, general characteristics and development of ornamental plants. Lectures and laboratory work. Twice a week. First term.

9. **COMMERCIAL FLORICULTURE.** A study of the propagation and culture of ornamental plants, including the general management of plant houses, the marketing of cut flowers and bedding plants. Lectures, recitations and laboratory work. Twice a week. Second term.

10. **AMATEUR OR HOME FLORICULTURE.** Including the study of window gardening and general management of house plants; the out-door flower garden and treatment of flower beds and borders. Lectures, recitations and laboratory work. Twice a week. Third term.

11. **ARBORICULTURE.** A study of native and introduced trees and shrubs; their use for timber, ornament, shade, shelter and hedges; methods of propagation and culture. Lectures and field work. Twice a week. First term.

12. **FORESTRY AND SYLVICULTURE.** A study of the influence of forests upon soils, crops and climate; forestry in Europe; value of trees for timber; establishment and management of small plantations of forest trees; how to improve and extend existing woodland. Lectures and laboratory work. Twice a week. Second term.

13. **LANDSCAPE GARDENING.** A study of the art of producing picture-like or landscape effect; the making of lawns, walks and drives, and the correct planting of trees, shrubs and flowers for the external adornment of home and public grounds. Lectures and practice. Twice a week. Third term.

INDUSTRIAL ARTS AND SHOPWORK

[Hayes Hall, Rooms 9, 12, 17, 18, 5 and 6]

INDUSTRIAL ARTS

Professor Sanborn, Mr. Knight, Mr. Renck, Mr. Crowe, Mr. McIntire

1. **TOOLS, MACHINES.** Lectures and recitations on hand and machine tools and the principles of mechanism and mechanics underlying their design, construction and operation. Three times a week.

2. **DESIGNING.** Problems in drawing and design to accompany Course 1. Three drawing periods a week.

3. **SHOP EQUIPMENT. APPLIANCES AND MANAGEMENT.** A continuation of Course 1. Lectures and recitations on the strength and durability of the materials used in construction; shop and factory buildings and their construction; power, power transmission and prime movers; automatic machines and other special devices for turning out cheap and accurate work: methods of compensation and shop accounts and management. Three times a week.

4. **ADVANCED DESIGNING.** Problems in the design of buildings and the arrangement of machinery, line-shafting, etc., for manufacture plants; to accompany Course 3. Three drawing periods a week.

5. **WORKSHOPS AND APPLIANCES.** Lectures and problems on the construction of shop buildings and the arrangement of machinery; power required and the means of transmission: friction in line-shafting and the efficiency of machinery: automatic machines and special shop appliances. Three times a week.

6. **MACHINE DESIGN.** Application of the principles of mechanics and strength of materials to the problems of machine designing. Five times (ten hours' practice) a week.

SHOPWORK

1. **CARPENTRY AND PATTERN MAKING.** Exercises and practice in carpentry, wood-turning and pattern making, including sawing, planing, mortising, splicing, framing and other work involving the use of the ordinary carpenter tools; center and chuck turning; the making of finished patterns; and enough elementary moulding to illustrate draft, parting, cores, etc.

2. **FORGING.** Exercises and practice in iron and steel forging, including such operations as drawing, bending, forming, upsetting, welding and the making and tempering of punches, drills, chisels, lathe tools and springs.

3. **FOUNDRY WORK.** Exercises and practice in tempering sand and preparing moulds of machine parts in the sand, core-making, melting iron and brass, and the pouring of castings.

4. **CHIPPING AND FILING.** Exercises and practice in vise work, including chipping in cast and wrought iron; surface filing, squaring, fitting, finishing, and the scraping of surface plates.

7. **CARPENTRY AND PATTERN MAKING.** Similar to Shopwork 1.

8. **CARPENTRY: CABINET WORK.** Exercises and practice in cabinet making including panelling, mitre and dovetail joints, etc.; use of power tools.

9. **ADVANCED PATTERN MAKING.** Continuation of pattern work of Shopwork 7.

11. **FORGING.** Similar to Shopwork 2.

12. **ADVANCED FORGING.** Tool making, tempering of taps, dies, cutters, etc.; annealing; case hardening; ornamental iron work, etc.; visits to shops.

13. **MACHINE WORK.** Exercises and practice in hand-turning in iron and brass on speed lathes; and straight and taper turning, boring, fitting, chucking, thread-cutting, etc., on engine lathes.

14. **MACHINE WORK.** Exercises and practice on the lathe, planer, shaper, drill press and milling machine, with use of small tools as drills, taps, dies, reamers, counterbores, etc.; construction of parts of actual machines.

15. **ADVANCED MACHINE WORK.** Exercises and practice on turret lathe, universal, surface and tool grinding machines, gear cutting, etc.

16. **ADVANCED MACHINE WORK.** The construction and use of jigs and templates; the accurate laying out of work; the duplication of parts, the production of work rapidly and economically, etc.

17. **ADVANCED MACHINE WORK.** The making and use of special tools and fixtures, standard plugs and collars, standard caliper and limit guages; error limits in modern machine construction; methods of testing the accuracy of machine tools; etc.

SHOPWORK REQUIRED

Number	Credit	Year	Term	Courses in
3	2	2	1	M. E.: I. A. (short).
	3	2	1	I. A.: Man. Tr.
4	2	2	1	E. E.
	3	3	1	I. A.: Man. Tr.
	3	2	1	I. A. (short).
	3	2	2	M. E.
	2	1	3	Clay-work (short).
	2	2	3	E. M.
	3	4	1	Cer.
7	3	1	1	I. A. (short).
	3	2	1	Chem.: I. A.: Man. Tr
	2	2	1	E. M.
	4	1	3	E. E.: M. E.
8	5	2	3	I. A.: Man. Tr.
9	3	2	2	I. A.: Man. Tr.
	3	1	2	I. A. (short).
11	2	2	1	E. E.
	3	2	1	M. E.
11	2	2	2	E. M.
	3	2	2	Chem.: I. A.: Man. Tr.
	3	1	3	Clay-w'k (short): I. A. (short)
	3	2	3	Mining (short).
	3	3	3	Cer.
12	3	2	3	I. A.: Man. Tr.
13	3	2	2	E. E.
	3	3	2	I. A.: Man. Tr.
	5	2	2	I. A. (short).
	3	2	3	M. E.
14	3	3	1	M. E.: E. E.
	3	3	3	I. A.: Man. Tr.
15	3	4	1	I. A.: Man. Tr.
	4	3	2	M. E.
	5	2	3	I. A. (short).
16	3	4	2	I. A.: Man. Tr.
17	3	4	3	I. A.

LATIN

[University Hall, Rooms 29, 28 and 39]

Professor Derby, Associate Professor Hodgman, Assistant Professor Elden

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

Courses 51, 52, 53, and 54 in the order named must precede the Elective Courses 55, 56, 57, 58, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78.

FIRST SEMESTER

51. **LIVY — BOOKS XXI AND XXII; TERENCE**—*Pharmio.* Four times a week.

53. **HORACE** — *Odes;* **CATULLUS** — *Selections;* **TACITUS** — *Agricola.* Four times a week.

55. **ROMAN HISTORIANS** —**TACITUS** — *Historiae;* **SUETONIOUS.** Three times a week.

57. **ROMAN PHILOSOPHY.** Three times a week. (Not offered in 1900–1901.)

59. **PHARMACEUTICAL LATIN.** Five times a week.

61. **LINGUISTICS AND INSCRIPTIONS.** Two times a week. (Not offered in 1900–1901.)

63. **TEACHERS' COURSE.** Two times a week.

65. **ROMAN RHETORIC AND ORATORY.** Three times a week.

67. **GREEK AND ROMAN ANTIQUITIES.** Lectures, illustrated. Two times a week.

69. **CICERO'S PHILOSOPHY.** *Tusculanae Disputationes, De Finibus.* Three times a week.

71. **LATIN LITERATURE.** Once a week.

73. **ROMAN POLITICAL AND LEGAL ANTIQUITIES.** Once a week.

75. **LATIN WRITING.** Twice a week.

77. **LATIN PROSEMINARY.** Three hours a week.

SECOND SEMESTER

52. **EARLY LATIN COMEDY** — **PLAUTUS** — Mostellaria: **CICERO** — *Selected Letters.* Four times a week.

54. **PLINY'S** *Letters;* **TIBULLUS, PROPERTIUS, OVID.** Four times a week.

56. **ROMAN SATIRE.** Three times a week.

58. **JUVENAL. MARTIAL.** Three times a week.

60. **PHARMACEUTICAL LATIN** — Continuation of Course 59. Five times a week.

62. Continuation of Course 61. Two times a week.

64. Continuation of Course 63. Two times a week.

66. **LATER LATIN WRITERS.** Three times a week.

68. **GREEK AND ROMAN ANTIQUITIES.** Lectures, illustrated. Two times a week.

70. **SENECA,** *Selections;* **PLAUTUS,** two plays. Three times a week.

72. Continuation of Course 71. Once a week.

74. Continuation of Course 73. Once a week.

76. Continuation of Course 75. Twice a week.

78. Continuation of Course 77. Three hours a week.

COLLEGE OF PHARMACY

1. **PHARMACEUTICAL.** Five times a week. First, second and third terms.

LAW

[UNIVERSITY HALL]

FIRST YEAR

FIRST SEMESTER

Elementary Law (Robinson, Walker and Blackstone).

SECOND SEMESTER

Agency (Mechem); Contracts (Bishop); Criminal Law (Hawley); Sales (Tiedeman); Torts (Cooley).

SECOND YEAR

FIRST SEMESTER

Bailments (Hale); Commercial Law (Tiedeman); Evidence (Underhill or Greenleaf); Pleading (Phillips).

SECOND SEMESTER

Construction of Contracts (Jones); Partnership (Parsons); Real Property (Tiedeman); Wills (Schouler).

THIRD YEAR

FIRST SEMESTER

Constitutional Law (Black); Private Corporations (Taylor); Municipal Corporations (Tiedeman); Equity Jurisprudence (Fetter).

SECOND SEMESTER

Ethics (Sharswood); Insurance (Richards); Negligence of Municipal Corporations (Jones); Suretyship (Baylies.)

MATHEMATICS

[UNIVERSITY HALL, Rooms 39, 41, 43 and 45]

Professor Bohannan, Associate Professor McCoard, Assistant Profesor Arnold, Assistant Professor Swartzel, Mr. Rasor, Miss Ball

A. TERM COURSES

1. **ELEMENTARY ALGEBRA.** *Venable.* Five times a week. First term (Short Course in Agriculture.)
3. **PLANE GEOMETRY.** *Venable.* Five times a week. First or second terms.
3*a*. **PLANE GEOMETRY.** *Venable.* Five times a week. Second term. (Short Courses in Agriculture and Clay-working.)
13. **SOLID GEOMETRY.** *Venable.* Five times a week. Second term.
14. **PLANE TRIGONOMETRY.** *Loney.* Five times a week. First or third terms.

15. **ANALYTICAL AND SPHERICAL TRIGONOMETRY.** *Loney*, with notes on Spherical Trigonometry. Twice a week. Second term.

16. **COLLEGE ALGEBRA.** *Taylor.* Three times a week. Second term.

17. **PLANE ANALYTICS.** *Loney.* Five times a week. Third term.

18. **ANALYTICS AND DIFFERENTIAL CALCULUS.** *Loney, Venable, Edwards.* Five times a week. First term.

19. **DIFFERENTIAL CALCULUS.** *Edwards.* Five times a week. Second term.

20. **INTEGRAL CALCULUS.** *Edwards.* Five times a week. Third term.

11. **DIFFERENTIAL EQUATIONS.** *Edwards.* Once a week. First term.

8. **LEAST SQUARES.** *Merriman.* Twice a week. First term.

B. SEMESTER COURSES

FIRST SEMESTER

55. **PLANE TRIGONOMETRY** (*Loney*) and 57, **ALGEBRA.** (*Taylor*). Five times a week.

59. **ANALYTICS** (*Loney, Venable*) and 61, **DIFFERENTIAL CALCULUS** (*Edwards*). Five times a week.

63. **ADVANCED MATHEMATICS.** Topics will be changed from year to year to meet the wishes of the students. Selections may be made from the following courses: (a) Advanced Calculus (*Picard Houel*); (b) Differential Equations (*Johnson, Murray, Forsythe, Craig*); (c) Higher Plane Curves (*Salmon*); (d) Advanced Analytical Geometry (*Casey, Salmon*); (e) Analytical Geometry of Three Dimensions (*Chas. Smith, Frost, Salmon*); (f) Theory of Equations (*Burnside and Panton*); (g) Modern Higher Algebra (*Chrystal Salmon, Serret, Cole's Netto*); (h) Modern Geometry (*Cremona, Reye, Steiner, Von Staudt, Chasles*); (i) Determinants (*Muir*); (j) Elliptic Functions (*Weber, Halphen, Durege, Hermite, Greenhill, Briot and Bouquet*); (k) General Theory of Functions (*Forsythe, Harkness and Morley, Tannery, Weierstrass, Durege, Thoame, Biermann*); (l) Potential Functions (*Clausius, Riemann, Dirichlet, Peirce*); (m) Mathematical Theory of Electricity (*Mascart and Joubert*); (n) Higher Geodesy (*Clarke, Helmert, Jordan*); (o) Spherical Harmonics (*Byerly, Ferrers, Heine*); (p) Mathematical Optics; (q) History of Mathematics. Credit, one to ten hours.

65. **PROBLEMS ON ALL PAST WORK.** Once a week.

67. **ALGEBRA, ANALYTICS, CALCULUS.** Three times a week. Taylor's College Algebra.

SECOND SEMESTER

56. **ALGEBRA** (*Taylor*), and 58, **PLANE ANALYTICS** (*Loney*). Five times a week.

60. **CALCULUS** and 62, **DIFFERENTIAL EQUATIONS** (*Edwards.*) Five times a week.

64. Continuation of Course 63. Credit, one to ten hours.

66. Continuation of Course 65. Once a week.

68. **TRIGONOMETRY, ANALYTICS, CALCULUS.** Three times a week. Lyman and Goddard's Trigonometry.

MECHANICAL ENGINEERING

[HAYES HALL, Room 12; MECHANICAL HALL, Second Floor]

Professor Magruder, Associate Professor Hitchcock, Mr. Hale, Mr. Grate

3. **MECHANISM.** Lectures and recitations on the principles of mechanism and mechanical movements. Five times a week. (Second Term, third year, Mechanical and Electrical Engineering Courses.)

The accurate laying out of movements, embodying the principles of mechanism. Twice a week. (Third Term, third year, Course in Mechanical Engineering.)

6. **ANALYTICAL MECHANICS.** Five times a week. (First and Second Terms, third year; Courses in Architecture, Ceramics, and Civil, Electrical, Mechanical and Mining Engineering.)

7. **STRENGTH OF MATERIALS.** Recitations and lectures on the elastic and ultimate resistance of the materials of engineering to stress and their use in structures and machines. Lectures on elementary hydraulics and the flow of water through orifices and pipes over weirs, and in streams, and on measuring the same. Five times a week. (Third Term, third year, same as 6.)

12. **EXPERIMENTAL ENGINEERING LABORATORY.** Twice a week. (First Term, third year, Course in Mechanical Engineering.)

14. The same. Four times a week. (Second Term, fourth year, Course in Mechanical Engineering.)

15. The same. Three times a week. (Third Term, fourth year, Course in Mechanical Engineering.)

17. The same. Three times a week. (Second Term, fourth year, Course in Civil Engineering.)

18. **MACHINE DESIGN.** Recitations on Unwin's Machine Design, with lectures on American Practice. Five times a week. (First and Second Terms, fourth year, Course in Mechanical Engineering.)

19. **MACHINE DESIGN.** Practical applications of the principles of machine design. Five drawing periods a week. (Third Term, fourth year, Course in Mechanical Engineering.)

21. **THESIS WORK.** Five times a week. (Third Term, fourth year, Course in Mechanical Engineering.)

22. **TIMBER AND MASONRY.** Lectures on the construction of foundations and structures in timber and masonry. Five times a week. (The last three-fifths of Second Term, third year, Courses in Mechanical Engineering and Industrial Arts.)

23. **MATERIALS OF CONSTRUCTION.** Lectures on the materials used in architecture and building construction, and laboratory exercises on their properties. Four times a week. (First Term, fourth year, Course in Architecture.)

24. **EXPERIMENTAL ENGINEERING LABORATORY.** Three times a week. (First and Second Terms. Elective to third and fourth year engineers.)

35. The same. Five times a week. (Third Term, fourth year, Courses in Civil and Mining Engineering.)

27. The same. Five times a week. (First Term, fourth year, Course in Mechanical Engineering.)

28. The same. Twice a week. (Third Term, third year, Course in Electrical Engineering; First Term, fourth year, Course in Industrial Arts; and Third Term, Course in Manual Training.)

29. The same. Three times a week. (First Term, fourth year, Course in Electrical Engineering.) Twice a week. (Second Term, fourth year, Course in Industrial Arts.)

30. The same. Twice a week. (Second Term, fourth year, Course in Electrical Engineering; Third Term, fourth year, Course in Industrial Arts.)

31. **HYDRAULIC MACHINERY.** Recitations and lectures on pumping machinery. Three times a week. (Third Term, fourth year, Course in Mechanical Engineering.)

32. **MECHANICAL ENGINEERING AND POWER PLANTS.** A descriptive study of steam and gas engines, boilers, pumps, injectors and other machinery used in plants generating power. Five times a week. (Third Term, third year, Courses in Mechanical and Electrical Engineering; Third Term, fourth year, Courses in Industrial Arts and Manual Training.)

33. **STEAM ENGINES AND BOILERS.** A detail study of steam using and steam generating machinery. Five times a week. (First Term, fourth year, Courses in Mechanical and Electrical Engineering.)

34. **THERMODYNAMICS.** Lectures and recitations on the transmutations of heat and mechanical energies in steam, gas and air engines, and in air and ammonia compressors, together with a study of the tests of ideal and actual engines and of their indicator diagrams; the flow of gases through pipes and orifices. Five times a week. (Second Term, fourth year, Course in Mechanical Engineering.)

METALLURGY AND MINERALOGY

[Chemical Hall, Rooms 4 and 3]

Professor N. W. Lord, Mr. Somermeir

COLLEGE OF ENGINEERING

2. **MINERALOGY.** Lectures. Similar to Course 52 in College of Arts, Philosophy and Science, but more practical, and arranged so as to be preparatory to Determinative Mineralogy (Course 3). Three times a week. Third term.

3. **DETERMINATIVE MINERALOGY.** Laboratory course in practical determination of minerals by physical and chemical tests. Each student is furnished with a set of apparatus, and works under an instructor's inspection. Brush's *Determinative Mineralogy* is used as a manual. Five times a week. Third term.

4. **METALLURGY.** A course of lectures upon fuel and its uses, iron and steel, copper, lead, gold and silver, their properties, tests, ores and details of the modes of reduction. The lectures are supplemented by a careful study of references to standard works and journals. Five times a week. First and second terms.

5. **METALLURGICAL LABORATORY.** Lectures and laboratory work. Laboratory practice in the analysis of iron and steel, fuel and slags, and the assays of lead, copper and zinc ores by wet methods, using approved methods as practiced in technical laboratories of metallurgical works. Course 5 must be preceded by Agricultural Chemistry, Courses 1, 8, 9; or by General Chemistry, Courses 7 and 12. Five laboratory periods a week. Three terms.

6. **ASSAYING.** Laboratory work. Practical work in the assaying of gold, silver and lead ores, by furnace methods. Oral instruction, with reference to standard books on assaying. Five laboratory periods a week. Second term.
7. **METALLURGICAL CONSTRUCTION.** Practice in the designing of furnaces and other metallurgical machinery, including detail drawings and estimates. Three times a week. First term. (Professors Lord and Ray.)
8. **ORE DRESSING AND COAL WASHING.** Lectures. Instruction in the methods of concentrating and enriching ores and fuels by mechanical means. Lectures with reference to Rittinger's *Aufbereitung;* Callon's *Course d' Exploration des Mines;* Kunhardt's *Ore Dressing*, and various papers in technical journals. Twice a week. First term.
9. **MINERAL CHEMISTRY.** Lectures and laboratory practice. Lectures upon fire damp, mine explosions, explosives, boiler, waters, poisonous gases, iron ores; iron and steel, their properties and modes of manufacture; coal and coke. Five hours a week. Third term.

MILITARY SCIENCE AND TACTICS

[ARMORY]

Major J. M. Burns, U. S. A., Retired

1. **MILITARY DRILL.** Three times a week through the year.
2. **TACTICS.** Lectures and recitations. Twice a week. Second term.
3. **ART OF WAR.** Lectures and recitations. Twice a week. Second term.

MINE ENGINEERING.

[CHEMICAL HALL, Room 26]

Associate Professor Ray

ELEMENTARY ALGEBRA. (Mathematics 2.) Wentworth. Five times a week. Three terms.

1. **MINE SURVEYING.** Lectures and field practice. This is similar to Course 4, but more elementary. The same text is used. The students have more practice in the drawing-room. Five times a week. First term.
2. **VENTILATION AND HAULAGE.** Lectures illustrated by experiments and maps of mines and models when possible, tests by safety lamps and anemometers, and solution of air distribution in coal mines. Five times a week. Second term.
3. **MINE OPERATING.** A course of lectures and practical instruction in mine book-keeping and accounts, cost of working, etc., particularly adapted to Ohio coal mining. Five times a week. Third term.
4. **MINE SURVEYING.** Field Practice in the use of instruments for surface and underground surveys. Full notes are taken, and maps and plans made in the drawing-room. Davie's *Surveying*, by Van Amringe, is used as a text-book. Five times a week. First term.
5. **MINE ENGINEERING.** Lectures. Mine operating, mining machinery, ventilation, shaft-sinking, working out deposits, etc. Constant reference is required to the standard works and to the leading technical journals, with practice in designing mine plants, draughting and estimates. Five times a week through the year.
6. **PLANS AND SPECIFICATIONS.** Five times a week. Third term. [Professors Lord and Ray.]

PHARMACY

[Chemical Hall, Rooms 13 and 12]

Professor Kauffman, Assistant Professor Landacre, Assistant Professor Dye

6. **PHARMACY.** General pharmaceutical processes. Lectures three times a week. First term.
7. **PHARMACY.** United States Pharmacopeia official preparations. Lectures twice a week. Laboratory practice daily. Second term.
8. **DISPENSATORIES.** Official preparations. Lectures twice a week. Laboratory practice daily. Third term.
9. **PHARMACEUTICAL CHEMISTRY.** Unofficial preparations. The National Formulary. Lectures twice a week. Laboratory practice daily. First term.
10. **EXTEMPORANEOUS PHARMACY.** Prescription practice. Lectures once a week. Laboratory practice three times a week. Second term.
11. **GENERAL PRACTICE.** Lectures twice a week. Dispensing practice daily. Prescription practice daily. Third term.
12. **MATERIA MEDICA.** Official drugs and classification. Three times a week. First term.
13. **MATERIA MEDICA.** Official and unofficial drugs. Three times a week. Second term.
14. **MATERIA MEDICA AND THERAPEUTICS.** Snythetic Products. Poisons and Antidotes. Three times a week. Third term.
15. **PHARMACEUTICAL ASSAYING.** Three times a week. First term.
16. **METHODS OF MANUFACTURE.** Three times a week. Second and third terms.
17. **GENERAL PHARMACY.** Two lectures, three laboratory periods a week. Through the year.
18. **LABORATORY.** Special work for veterinary students. Five times a week. Third term.

PHILOSOPHY

[University Hall, Rooms 33, 50, 49 and 51]

Professor Scott, Mr. Hamilton

FIRST SEMESTER

51. **GENERAL PSYCHOLOGY.** Logic Begun. Four times a week. Required in the Courses for B. A., B. Ph. (L), and B. Ph. (M. L.)
53. **GENERAL PSYCHOLOGY.** Three times a week. Required in the Courses for B. Ph. (E.), B. Sc., for Law and Journalism.
55. **ETHICS.** Three times a week. Required in Course for B. Ph. (E.).
57. **HISTORY OF ANCIENT AND MEDIÆVAL PHILOSOPHY.** Three times a week. Elective after Courses 51 and 52.
59. **INTRODUCTION TO PHILOSOPHY.** Twice a week. Elective after Courses 51, 52, 56 and 57 or after Courses 53, 54, 55 and 56.
61. **PHYSIOLOGICAL AND EXPERIMENTAL PSYCHOLOGY.** Twice a week. Elective. This course begins with a general survey of the organic basis of personality, attention, etc., taking up in turn the sense organs and perception, motor processes and the personal equation.
63. **LEADING WORKS IN PHILOSOPHY.** Twice a week. Elective on the same conditions as Course 59.

SECOND SEMESTER

52. **LOGIC COMPLETED, ETHICS.** Four times a week. Follows Course 51.

54. **LOGIC.** Three times a week. Follows Course 53.

56. **HISTORY OF MODERN PHILOSOPHY.** Three times a week. Required after Course 55. Also elective after Courses 51 and 52.

60. **METAPHYSICS.** Twice a week. Elective after Courses 51, 52, 57 and 56 or after Courses 53, 54, 55 and 56.

62. **PHYSIOLOGICAL AND EXPERIMENTAL PSYCHOLOGY.** Twice a week. Elective. The work of this semester presupposes Course 61. Individual topics will be assigned and the student will be required to report upon the general literature of the subject as well as to make an experimental study of some of the controverted points.

64. **LEADING WORKS IN PHILOSOPHY.** Twice a week. Elective on the same conditions as Course 60.

PHYSICS

[University Hall, Rooms 10, 14, 23 and 24]

Professor Thomas, Assistant Professor Boyd, Mr. Kester

COLLEGES OF AGRICULTURE, ENGINEERING AND PHARMACY

1. **ELEMENTARY PHYSICS.** Recitations and experimental lectures. Five times a week. First and Second Terms. Text: Carhart & Chate's "Elements of Physics." (Required in all Short Courses.)

2. **MECHANICS AND HEAT.** Electricity and Magnetism, Sound and Light. Lectures and recitations. Three times a week. Through the year.

3. **PHYSICS.** Extension of Course 2, with practice in solution of problems. Twice a week. Through the year.

4. **ELECTRICITY AND MAGNETISM.** Lectures and recitations. Three times a week First term. (Third year, Electrical Engineering).

5. **PHYSICAL LABORATORY.** Elementary manipulation. Length, mass and time measurements. Work in density, elasticity and heat. Three times a week. Second and third terms.

6. **PHYSICAL LABORATORY.** Theory and practice of magnetic and electrical measurement, including the testing and standardizing of instruments; conductivity of conductors; insulation, capacity and resistance of insulated conductors and cables; temperature co-efficients; commercial measuring and testing instruments; strength and distribution of magnetic fields, magnetic moments, permeability: work in light including optical constants; spectroscopy; photometry of gas, electric and other lights. Five times a week. First, second and third terms. (Third year, Electrical Engineering.)

7. **PHYSICAL LABORATORY.** Two to three times a week. Through the year. Course 7 must be preceded by Course 2.

9. **PHYSICAL LABORATORY.** A second year's work in the Physical Laboratory. Three times a week, with five hours' credit. Course 9 must be preceded by Course 7.

The work in the Physical Laboratory begins with exercises in length, mass and time measurement, making use of scales, tapes and bars, micrometer screws, micrometer microscopes, the dividing engine, the cathetometer, the balance, chronometers, chronoscopes, etc. This course is intended to give the student facility in the use of instruments and knowledge of the theory of their construction and adjustment.

The determination of various physical constants follows, with elementary exercises in heat, light, electricity and magnetism; after which the student takes up such advanced work as his taste and skill permit. The experimental work is accompanied by instruction in methods and in the discussion of results.

11. **MECHANICS, SOUND AND HEAT.** One lecture, two laboratory periods a week. Required in the Course in Pharmacy.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

FIRST SEMESTER

51. **MECHANICS, HEAT, ETC.** Three times a week. Second year. Science Course. Elective in the first year of the Courses of Arts and Philosophy.

53. **MECHANICS, SOUND AND HEAT.** One lecture, two laboratory periods a week. Elective in the First year of the Courses of Arts and Philosophy.

55. **LABORATORY.** Three to five times a week.

57. **LABORATOXY.** Three to five times a week. Course 57 must be preceded by Course 55.

59. **THEORETICAL PHYSICS.** Five times a week. Lectures and assigned readings. Graduate and advanced undergraduate course.

61. **LABORATORY.** Five hours a week. To be preceded by Courses 55, 56, 57 and 58.

SECOND SEMESTER

52. **ELECTRICITY, MAGNETISM, ETC.** Three times a week. Follows Course 51.

54. **ELECTRICITY, MAGNETISM, ETC.** One lecture, two laboratory periods a week. Follows Course 53.

56. **LABORATORY.** Continuation of Course 55.

58. **LABORATORY.** Continuation of Course 57.

62. **THEORETICAL PHYSICS.** Five times a week. Follows Course 59.

64. **LABORATORY.** Five hours a week. Continuation of Course 61.

PHYSIOLOGY

(*See* Anatomy and Physiology)

POLITICAL ECONOMY

(*See* Economics)

POLITICAL SCIENCE

[University Hall, Room 27]

Professor Knight

(All Courses in Political Science must be preceded by History 55 or 56)

FIRST SEMESTER

51. **INTERNATIONAL LAW.** Lectures and text-book. A study of public international law, Lawrence's *Principles of International Law.* Twice a week. (Given biennially. Not open in 1900–1901.)

53. **POLITICAL INSTITUTIONS OF THE UNITED STATES.** Lectures and recitations. A study of the origin, nature and workings of the political institutions of the United States, and an analysis of the form and powers of the government. Bryce's *American Commonwealth.* Three times a week.

55. **GOVERNMENT OF DEPENDENCIES.** A study of the political institutions of the leading colonial governments. Lectures, assigned readings and special reports. Twice a week.
(Given biennially. Not offered in 1900–1901.)

SECOND SEMESTER

52. **MUNICIPAL GOVERNMENT.** Lectures, collateral readings and special reports. A study of the development and status of modern municipalities, and a comparative study of recent American municipal charters. Twice a week. This Course forms a good sequent to Political Science 55, but is not dependent upon it.

54. **COMPARATIVE POLITICAL INSTITUTIONS OF EUROPE AND AMERICA.** Lectures, recitations, collateral readings and special reports. A comparative study of the political institutions and governmental forms and powers in the United States, England, Germany, France and Switzerland. Three times a week. Course 54 must be preceded by Course 53.

56. **HISTORY OF TREATIES AND MODERN DIPLOMACY.** A study of the leading treaties of modern times with special reference to their bearing upon international law. Accompanied by collateral reading and special reports. Twice a week. This course must be preceded by Course 51.

RHETORIC AND ENGLISH LANGUAGE

[UNIVERSITY HALL, Rooms 38, 40, 42, 44, 55.]

Professor Denney, Assistant Professors Graves, McKnight, Allen, Mr. Parker

Courses 51, 52, and either 53 or 54 are fundamental; Courses 55, 56, and 60, are advanced courses in composition; Courses 57, 58, 75 and 76 are advanced courses in public speaking; Courses 69, 70, 71, 72, 73 and 74 are philological; Courses 67 and 68 are pedagogical. Courses 59, 61, 62, 73 and 74 are usually found suitable for graduate students as well as for advanced undergraduates. Further courses of study exclusively for graduate students are arranged at the beginning of each year to meet individual needs and purposes.

FIRST SEMESTER

51. **ENGLISH COMPOSITION.** Three times a week. Credit two and one-half hours.
(a) Scott and Denney's "Paragraph Writing." Themes. Twice a week.
(b) Oral Practice. Once a week with the instructor in public speaking.

53. **STUDIES IN EXPOSITION.** Four times a week.
(a) Rhetorical analysis of prose; with essay-writing. Three times a week.
(b) Oral composition. Once a week with the instructor in public speaking. Course 53 must be preceded by Course 52.

55. **RAPID WRITING.** Once a week. The preparation of articles for the press, with exercises in observation, reporting, abstracting, condensation, expansion, interviewing, proof-reading, correspondence, and a study of newspaper forms. A special course for students preparing for journalism. Open to those who have passed Course 53 or 54.

57. **BRIEF MAKING AND ARGUMENTATION.** Three times a week. Practice in making briefs of noted speeches and original briefs for debate; lectures on logical analysis, evidence and argumentation. Class debates once a week, criticised by the instructor in public speaking. Course 57 must be preceded by Course 53 or 54.

59. **POETICS.** Twice a week. Lectures, prescribed readings, and reports. Gummere's "Hand-book" and Aristotle's "Theory of Poetry" used for reference. Course 57 must be preceded by Course 53 or 54.

61. **RHETORICAL THEORY.** Two hours a week. Lectures on the principles of style, and theories of rhetoric as historically developed, accompanied by special investigations of rhetorical problems with reports and discussions. An introduction to methods of research and the use of material. Exclusively for advanced undergraduates and graduates, who are making their theses in one of the English Departments.

67. **TEACHERS' COURSE IN RHETORIC.** Two hours a week. Lectures, conferences and prescribed readings on the teachings of composition and rhetoric in the schools. A special course for teachers and those intending to teach. Open only to advanced undergradutes, and to teachers who hold auditors' tickets.

69. **HISTORY OF THE ENGLISH LANGUAGE.** Twice a week. Emerson's "Brief History," with lectures and reading.

71. **OLD ENGLISH PROSE.** Twice a week. Bright's "Anglo-Saxon Reader." Course 71 must be preceded by Courses 69 and 70.

73. **OLD AND MIDDLE ENGLISH PHILOLOGY.** Two hours a week. Course 73 must be preceded by Courses 71 and 72.

75. **EXTEMPORE SPEAKING.** Two hours a week. Speaking from briefs and topical outlines on subjects previously mastered. Course 75 must be preceded by Courses 57 and 58.

SECOND SEMESTER

52. **ENGLISH COMPOSITION.** Three times a week. Credit two and one-half hours.

(a) Cairns' "The Forms of Discourse." Themes. Twice a week.

(b) Oral Practice. Once a week with the instructor in public speaking. Course 52 must be preceded by Course 51.

54. **STUDIES IN EXPOSITION.** Four times a week. Repetition of Course 53. Course 54 must be preceded by Course 52.

56. **RAPID WRITING.** Once a week. Continuation of Course 55, and must be preceded by Course 55.

58. **BRIEF-MAKING AND ARGUMENTATION.** Three times a week. Continuation of Course 57 and must be preceded by Course 57.

60. **SHORT STORIES.** Twice a week. Lectures, prescribed readings, reports, and practice under criticism. A study of the plan, purpose, diction, and structure of selected narratives, with plot analysis. Course 60 must be preceded by Course 53 or 54.

62. **PROBLEMS IN CRITICISM.** Two hours a week. Special research work, reports and a thesis. Course 62 must be preceded by Course 61.

68. **TEACHERS' COURSE IN ENGLISH LANGUAGE AND GRAMMAR.** Two hours a week. A special course for those engaged in teaching and those intending to teach. Open only to advanced undergraduates, and to teachers who hold auditors' tickets.

70. **DEVELOPMENT OF ENGLISH PROSE.** Twice a week. A rapid survey of the history of English idiom, with lectures and readings. Course 70 must be preceded by Course 69.

72. **OLD ENGLISH PROSE AND POETRY.** Continuation of Course 71 and must be preceded by Course 71.

74. **OLD AND MIDDLE ENGLISH PHILOLOGY.** Continuation of Course 73 and must be preceded by Course 73.

76. **EXTEMPORE SPEAKING.** Continuation of Course 75 and must be preceded by Course 75.

COLLEGES OF AGRICULTURE AND DOMESTIC SCIENCE, ENGINEERING AND PHARMACY

6. **ADVANCED RHETORIC.** Twice a week.

A. Prescribed readings in the literature of technology and science; and the analysis of specimens of this literature. Once a week.

B. Reports, abstracts, memoranda, and notes of lectures and of articles in the technical journals; practice in drawing specifications and writing brief papers on technical and scientific subjects. Once a week.

Two hours a week. (First, Second and Third Terms, second year, Courses in Industrial Arts, Manual Training, and Electrical and Mechanical Engineering; third year, Courses in Architecture, Ceramics, Chemistry, and Civil and Mining Engineering.)

5. **ENGLISH COMPOSITION.**

A. Scott and Denney's Paragraph–Writing; Macaulay's Warren Hastings; Cairn's Forms of Discourse; Themes. Twice a week.

B. Oral practice with the instructor in public speaking. Once a week.

(First, Second and Third Terms, first year.) Three times a week. Credit two and one–half hours. All four–year courses.

4. **ADVANCED COMPOSITION.** Twice a week. Elective.

ROMANCE LANGUAGES AND LITERATURES

[University Hall, Rooms 35 and 34.]

Professor Bowen, Assistant Professor Bruce

The Department of Romance Languages and Literature offers courses of instruction and research in the three leading languages of the group whose origin is to be traced to the Latin or Roman idiom. These three languages are the French, Italian and Spanish. The foremost place in the work of the Department is naturally assigned to the French. In the study of this language the first desideratum is a thorough reading knowledge, which shall lead directly to the study of the literature. For all the languages taught in this department, it is assumed that the highest educational value lies in the acquiring of the ability to read them intelligently, to translate them correctly, to understand, appreciate and compare the various phases of their literatures, and to grasp the principles of their historic development. The practical side of the work, that which deals mainly with the acquiring of the ability to speak these languages with accuracy and ease, is regarded as supplementary, and as such receives due attention.

Exclusive of library facilities, the Department possesses, as aids in illustrating and supplementing the work, the following collections: Complete set of maps (including Paris); illustrated volumes showing various phases of the arts and sciences, costumes and manners, public instruction, dramatic representations, etc., in France at different epochs; large photographs and engravings of the principal French writers; collections of French prose extracts for use in sight reading.

I. FRENCH

FIRST SEMESTER

51. **ELEMENTARY FRENCH.** Four hours a week. Grammar: Edgren's (Part I), Grandgent's Essentials, or Joynes' Minimum, with written exercises. Reader: Super's (from Part II) or Whitney's (Parts I and II) or Kuhns' French Reading for Beginners. In this course the study of the language is taken up from the beginning. Stress is laid at first upon the acquisition of a correct pronunciation, after which the entire energy of the student is directed toward the attainment of a full and accurate reading knowledge of the language. Grammar and composition are made to contribute to this end.

53. **SCIENCE READING.** Two hours a week. A course introductory to the vocabulary of scientific literature, designed to familiarize the student with technical terms and style. Open to those who have completed Courses 51 and 52, or who have received credit for French as an entrance subject.

55. **MODERN FRENCH LITERATURE.** Four hours a week. Contes and Novels: Bercy's *Contes et nouvelles modernes.* Balzac, Eugénie Grandet. Prose Composition: Edgren's French Grammar [Syntax] or Chardenal's French Exercises for Advanced Pupils. Lectures supplement the work; private reading required; systematic attention given to syntax and idiom. Open to those who have completed Courses 51 and 52, or who have received credit for French as an entrance subject.

57. **FRENCH COMEDY.** Three hours a week. Study of the growth of French Comedy, with work centering upon Molière [four plays], Regnard [le Joueur] and Beaumarchais [le Barbier de Séville]. Lectures and collateral reading. Open to those who have completed Courses 55 and 56.

59. **ADVANCED PROSE COMPOSITION.** One hour a week. Practice in speaking and writing French. Intended for advanced students who desire special training on the practical side of the language. Open to those who have completed Courses 55 and 56.

61. **FRENCH TRAGEDY.** Three hours a week. Racine and Voltaire. Lectures and readings, with assigned topics, reports and discussions. Part of the lectures given in French. Practical work continued. An advanced Course intended for students who have completed Courses 57, 58, 59 and 60. Any others must have the special consent of the head of the Department.

63. **FRENCH LITERATURE BEFORE THE SEVENTEENTH CENTURY.** Three hours a week. Special study of la Chanson de Roland. General Survey of the Old French period. Critical study of Montaigne [De l'institution des enfans]. Lectures (partly in French) on the literature of the sixteenth century. Assigned topics and reports. An advanced Course with the same conditions as in Course 61.

(Given biennially. Not offered in 1900–1901.)

65. **LITERARY CRITICISM IN FRANCE.** Two hours a week. Readings and lectures. Selections from Sainte-Beuve, Lemaitre, Brunetière and others. Open to those who have completed Courses 55 and 56.

SECOND SEMESTER

52. **MODERN PROSE AND PLAYS.** Continuation of Course 51. Four hours a week. Historical and narrative prose; one or more prose comedies. Sight reading is emphasized.

54. **SCIENCE READING.** Continuation of Course 53. Two hours a week.

56. **MODERN FRENCH LITERATURE.** Continuation of Course 55. Four hours a week. Lyric Poetry: Bowen's Modern French Lyrics. Drama: Comparative study of the classical and the romantic drama: Corneille, Horace; Hugo, Hernani. Private reading: Hugo's la Chute.

58. **RECENT FRENCH PROSE.** Three hours a week. Rapid reading with lectures. Critical study of some of the leading prose writers of the present, such as Bourget [Selections ed. Van Daell], Coppée [On rend l' argent], Daudet [le Nabab], Zola [la Débacle]. Open to those who have completed Courses 55 and 56.

60. **ADVANCED PROSE COMPOSITION.** Continuation of Course 59. One hour a week.

62. **CHATEAUBRIAND AND THE PRECURSORS OF THE ROMANTIC MOVEMENT.** Three hours a week. Lectures and readings, with assigned topics, reports and discussions. Part of the work conducted in French. Practical drill continued. An advanced course intended for students who have completed Courses 57, 58, 59, 60 and 61 (or 63.) Any others must have the special consent of the head of the Department.

64. **THE DEVELOPMENT OF THE FRENCH NOVEL.** Three hours a week. An advanced course with the same plan of work and the same conditions as in Course 62.

(Given biennially. Not offered in 1900–1901.)

Courses 62 and 64 are supplemented, toward the close of the year, by several lectures on: Methods of teaching French and the teacher's equipment.

66. **FRENCH TRAVEL-WRITERS.** Two hours a week. Readings and lectures. Scenes of travel from Gautier, Hugo and Dumas. Open to those who have completed Courses 55 and 56.

II. ITALIAN

51. **GRAMMAR AND READINGS.** Two hours a week. First Semester. Grandgent's or Edgren's Italian Grammar and Bowen's First Italian Readings. Open to those who have completed Courses 51 and 52 (or an equivalent) in French.

52. **GOLDONI AND DANTE.** Continuation of Course 51. Two hours a week. Second Semester.

(Italian is given biennially. Above Courses not offered in 1899–1900.)

III. SPANISH

51. **GRAMMAR AND READINGS.** Two hours a week. First Semester. Edgren's Spanish Grammar and Matze's First Spanish Readings.

52. **MODERN PROSE AND DRAMA.** Continuation of Course 51. Two hours a week. Second Semester. Alarcón el Capitán Veneno (Ford); Galdós, Dona Perfecta; Cortina, el Indiano. Brief talks on Spanish literature and philology.

(Spanish is given biennially. Above Courses not offered in 1900–1901.)

SANSKRIT

(*See* Germanic Languages)

SHOPWORK

(*See* Industrial Arts)

SOCIOLOGY

(*See* Economics and Sociology)

VETERINARY MEDICINE

[Veterinary Hospital and Townshend Hall]

Professor White, Dr. Lavery, Dr. Frederick, Dr. Brumley

COLLEGES OF VETERINARY MEDICINE AND AGRICULTURE

11. **VETERINARY ANATOMY:** Osteology. Lectures illustrated with skeletons and anatomical preparations. Dissections. Five times a week First term.

12. **MYOLOGY, SPLANCHNOLOGY.** Practical dissections and demonstrations on cadavers. Five times a week. Second term.

13. **ANGIOLOGY AND NEUROLOGY.** Lectures illustrated by drawings, in the dissecting room, and on anatomical models. Five times a week. Third term. Books recommended for reference and study: Strangeway's Veterinary Anatomy (new edition); Chauvau's Comparative Anatomy; McFaydean.

14. **GENERAL PATHOLOGY AND MORBID ANATOMY.** Lectures four times a week. First term. Text-book: Green's Morbid Anatomy.

15. **THEORY AND PRACTICE OF VETERINARY MEDICINE.** Sporadic, non-infectious diseases. Four times a week. Second term.

16. **THEORY AND PRACTICE OF VETERINARY MEDICINE.** Four times a week. Third term.

17. **THEORY AND PRACTICE OF VETERINARY MEDICINE.** Four hours a week. First term.

18. **THEORY AND PRACTICE OF VETERINARY MEDICINE.** Infectious and contagious diseases. Four times a week. Second term. Text book: Friedberger and Froehner

19. **GENERAL THERAPUETICS.** Lectures. Five times a week. Third term.

20. **GENERAL SURGERY.** Lectures and demonstrations on the use of antiseptics in wound healing; suturing and bandaging; use of local and general anæsthesis, etc. Five hours a week. First term.

21. **SURGIC L DISEASES** Lectures; illustrated by practical demonstrations, by drawings, on clinical cases. Head and neck. Five hours a week. Second term.

12. **SURGICAL DISEASES.** Continuation of 21. Trunk and limbs. Five hours a week. Third term.

23. **SURGICAL DISEASES.** Continuation of 22. Five hours a week. First term.

24. **OPERATIVE SURGERY.** Practical operations on narcotized subjects Three hours a week. Second term. Text books: Moeller; Liautard; Fleming.

25. **PRINCIPLES OF HORSESHOEING.** Lectures and demonstrations. Includes diseases of the foot and pathological shoeing. Four hours a week. First term. Text book: Dollar.

26. **MEAT INSPECTION.** Lectures and recitations. Text book: Peter's Meat Inspection.

27. **CANINE DISEASES.** Lectures and recitations. Three times a week. First term.

28. **CANINE DISEASES.** Continuation of 27. Three times a week. Second term. Text book: Mueller Glass.

29. **VETERINARY OBSTETRICS.** Lectures, recitations, and clinical practice. Three hours a week. Second term. Text books: Fleming; Dalrymple.

30. **OPHTHALMOLOGY.** Diseases of the Eye. Two hours a week. Third term.

31. **CLINIC IN THE VETERINARY HOSPITAL:** Stationary and Ambulatory. Daily at 10 to 12 m. Students of the second and third years are required to take part in the clinics. First, second and third terms.

32. **DISEASES OF THE COW:** Special Course for dairy students. Three times a week. Second term.

33. **VETERINARY MEDICINE FOR AGRICULTURAL STUDENTS.** Veterinary anatomy. Five times a week. First term.

34. **VETERINARY MEDICINE FOR AGRICULTURAL STUDENTS.** Contagious and non-infectious diseases. Five hours a week (one hour devoted to practical, clinical work). Second term.

35. **VETERINARY MEDICINE FOR AGRICULTURAL STUDENTS.** Contagious and non-infectious diseases. Five hours a week (one hour devoted to practical, clinical work). Second term.

ZOOLOGY AND ENTOMOLOGY

[Biological Hall, Rooms 3, 4, 7, 8, 9 and Third Floor]

Professor Osborn, Assistant Professor Hine, Mr. Landacre

COLLEGE OF AGRICULTURE

1. **INVERTEBRATE AND VERTEBRATE.** Three times a week. Invertebrate, first and second term; Vertebrate, third term. This course includes a general discussion of groups, dissection of types and an outline of classification. Especial attention is given to forms of economic importance either from their detrimental effects on crops, stock, etc., or from their utility in various industries or as domesticated species.

3. **ECONOMIC ENTOMOLOGY.** Insects of Forest, Orchard and Garden. Three times a week. Third term. A detailed study of injurious species intended particularly for students of Horticulture. The work includes field studies, collections, reports on observation, etc.

4. **ECONOMIC ENTOMOLOGY.** Twice a week, through the year. This Course must be preceded by Course 1. A systematic study of the group of insects with special reference to injurious and beneficial species. A foundation is laid for special study in Entomology. Preparation of collections, essays, life history studies and use of remedial measures along with laboratory studies on general anatomy and class recitations and lectures.

7. **SYSTEMATIC AND PRACTICAL ENTOMOLOGY.** Two lectures and one laboratory period a week. Third term. An elementary practical Course for students in the Short Course in Agriculture.

8. **PARASITES OF DOMESTIC ANIMALS.** A lecture course devoted to the principal parasitic animals affecting domestic animals intended especially to meet the needs of those who intend to give particular attention to stock raising. Once a week. First term.

9. **SPECIAL ENTOMOLOGY.** Studies of life-histories, collection and classification in selected groups. Field work and lectures. Four periods each week. Elective. Fall term.

10. **SPECIAL ENTOMOLOGY.** Studies of winter condition of Insects, Insecticides, Insecticide machinery, Methods of preparing insect illustrations, Greenhouse pests, etc. Four periods each week. Elective. Winter term.

11. **SPECIAL ENTOMOLOGY.** Investigations of selected groups or species. Lectures on Insects legislation, distribution, natural enemies, special methods of control, etc. Four periods each week. Elective. Spring term.

Courses 9, 10 and 11 are intended as practical courses in entomological research adapted especially for those who wish to give special attention to this branch with reference to future work in Agriculture or Horticulture and to furnish a preparation for those who have in view work as entomological investigators in experiment stations or as teachers in agricultural schools. They may be taken as graduate courses if not elected earlier or continued as special lines of research during a graduate course embracing other special subjects.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

Courses 57, 58, 59, 60, 61, 62 must be preceded by 51 and 52, 53 and 54, 64 or Zool. 1, of College of Agriculture.

FIRST SEMESTER

41. **COMPARATIVE ZOOLOGY.** Two lectures and one laboratory period a week. This course includes studies of types of different groups, discussions of principles and an outline of classification. Thomson's "Outlines" used as a basis.

53. **COMPARATIVE ANATOMY OF VERTEBRATES.** A laboratory course. Two laboratory periods and one quiz each week; devoted to Osteology, Myology, Splanchnology, Neurology and a full study of certain type forms. Weidersheim's "Comparative Anatomy of Vertebrates" is followed as a basis.

55. **COMPARATIVE ANATOMY OF VERTEBRATES.** A laboratory course. Four laboratory periods and one quiz each week. Similar to 53, but more extended.

57. **ZOOLOGY AND ANATOMY.** Advanced laboratory. Three laboratory periods a week.

On entering this course one may choose his work from any of the following lines:

(*a*). **ANATOMY OF THE FROG.** The guides used are Ecker's "Anatomy of the Frog," and Huxley and Martin's "Practical Biology." Both the gross anatomy and the histology will be studied, the student himself preparing the tissues, as directed; as time may permit, comparisons will be made with other Amphibia.

(*b*). **COMPARATIVE ANATOMY OF INVERTEBRATES.** The manuals used are: Shipley's "Invertebrate Zoology," Lang's "Text-book of Comparative Anatomy," McMurrich's Invertebrate Morphology" and Parker and Haswell's "Text-book of Zoology."

(*c*). **INVERTEBRATE EMBRYOLOGY.** Text-book, Translation of Korschelt and Heider's "Embryology of Invertebrates."

(*d*). **VERTEBRATE EMBRYOLOGY.** The embryology of the chick or frog will be thoroughly studied as a basis; this will be followed by a study of the embryology of the fish, amphibian, and mammal. The course aims to give thorough drill in embryological and histological technique. The books used are Foster and Balfour's "Elements of Embryology," and the works of Hertwig, Minot, Balfour and Marshall.

(*e*). **COMPARATIVE NEUROLOGY.** This is a course in the anatomy and histology of the central nervous system, and will include a study of the brain and spinal cord of all classes of vertebrates. Edinger's "Lectures on the Central Nervous System" will be followed, and numerous treatises and special papers used as a reference.

(*f*). **CELLULAR BIOLOGY.** Text-books, Hertwig's "The Cell and the Tissues;" and Wilson's "The Cell in Development and Inheritance."

A student whose major lies in Zoology may take two full years' work selected from subjects named in the foregoing paragraph.

Zoological Seminar. The class will meet weekly to discuss methods and present reviews of current literature. Each student will be expected to present at least one major and one minor review each term.

59. **ZOOLOGY AND ANATOMY.** Advanced laboratory. Five times a week. Similar to 57, but more extended.

61. **ENTOMOLOGY.** An advanced Practical Course. Five periods a week. The courses are designed for those who wish to make a thorough study of some particular group of insects or to follow some definite line of the science, either morphological or systematic, or to fit themselves for professional entomological work. The work will be arranged with each student.

The collections, monographs, and apparatus at the command of the Department afford excellent opportunities for advanced work in Entomology.

Students are required to take part in the Zoological Seminar of the preceding paragraph.

65. **ORNITHOLOGY.** Two laboratory periods a week. Advanced work on Morphology, Ecology and Classification of Birds.

SECOND SEMESTER

52. Continuation of Course 51. Lectures twice a week. One laboratory period.
54. Continuation of Course 53. Three laboratory periods a week.
56. Continuation of Course 55. Five laboratory periods a week.
58. Continuation of Course 57. Three laboratory periods a week.
60. Continuation of Course 59. Five laboratory periods a week.
62. Continuation of Course 61. Five laboratory periods a week.
66. Continuation of Course 65. Two periods a week.

ENROLLMENT

1899-1900

COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE

GRADUATE STUDENTS—4

Derby, Florence, B. Ph.....Columbus
Gilmore, William Henry, B. Sc. (Agr.).....Millersport
Nichol, Gertrude, B. Ph.....Columbus
Sheldon, Helen Griswold, A. B. (Vassar College).....Shepard

UNDERGRADUATES — 153.

	Course	Course Hours	Credit Hours	Home Address
*Abbott, George Franklin	Agr.	210½	56	Medina
Abbott, Carl B	Agr.	206	112	Medina
Adcock, James G	Agr. S.	98	...	Webb Summit
Armstrong, Edgar Manley	Dairying	...	...	Zanesville
Armstrong, Clara	Dom. Sci.	203	150	Columbus
*Arnold, Frank Washington	Agr.	210½	43½	Somerset
*Atherton, William Thomas	Agr.	210½	71	Carrollton
Baldwin, Ethel Florence	Dom. Sci.	202½	47	Columbus
Bauman, Christian William	Dairying.	...	...	Axtel
*Beale, Harry Glenn	Agr.	206	99	Mt. Sterling
*Beatty, Madge	Dom. Sci.	202½	41½	Columbus
Beneker, Robert Edgar	Agr.	210½	54½	Cincinnati
Boggs, Howard Shannon	Agr. S.	98	60½	Kingston
Bratton, Alice May	Dom. Sci.	203	144	Columbus
Breckenridge, William Kemper	Agr. S.	98	98+5	Watertown
Breese, Clarence Nye	Agr. S.	98	97+6	Lima
Bugby, Morris O	Agr.	210½	51½	Kingsville
*Bundy, Lyman Edmund	Special	...	47	Colerain
Byers, William Gerald	Agr. S.	98	48	Lilly Chapel
Cahill, Verrill W	Agr. S.	98	44	Tiro
Candy, Ella Belle	Special	...	24	Columbus
Carey, Nathan Harold	Dairying	...	...	Gurneyville
*Church, James Scott	Agr.	206	55½	Palmyra
Clark, Herman Alfred	H. & F.	206	96	Medina
Clark, Ollie Dwight	Agr. S.	98	48	Wheaton
Clawson, Lucy Blanche	Dom.Sci.S.	90	90+11½	Okeana
Coberly, Edward D	Agr. S.	98	50+2	Georgesville
Conradi, Albert Frederick	Agr.	206	98	New Bremen
*Cotton, Edwin Charles	H. & F.	206	115½	Elyria
Cotton, George Washington	Dairying	...	...	Elyria
Crabb, James Byel	Agr. S.	98	98+11	Mt. Sterling
Crawford, Mary B	Dom. Sci.	203	195+10	Blaine
Creamer, Jesse Carlton	Agr. S.	98	54	Jeffersonville
Dallas, John Thomas, B. Sc.	(Agr.)	...	...	Pine Valley
Davis, Carrie Samantha	Special	...	...	Rio Grande
*Davis, Ella Augusta	Dom. Sci.	202½	52½	Constantia

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Davis, Vernon Hayes, B. Sc.	(Agr.)	...	...	Byesville
Day, Albert Edward	Agr. S.	98	89+29	Mt. Carmel
*Demorest, Herbert Russell	Agr.	206	91	Columbus
Dixon, Eva Nicholson	Dom. Sci.	203	122	Columbus
Dock, Norton	Agr. S.	98	59+2	Cincinnati
*Dresbach, Mary	Dom. Sci.	203	132	Columbus
Dunlap, Frederick	Special	...	19	Chillicothe
Dunn, Hattie Franklin	Special	...	29	Columbus
Everett, William Russell	Dairying	...	...	Gnadenhutten
Ewart, John Weston	Dairying	...	...	Mogadore
*Ferguson, Ollie	Agr.	210½	33½	Steubenville
*Finlay, Annetta Jane	Dom. Sci.	203	104	Keene
Fippin, Elmer Otterbein, B. Sc.	(Agr.)	...	...	Galloway
Fisher, Milo Eddison	Agr. S.	98	44	Chili
Flory, Charles Henry	H. & F.	206	73	Arcanum
*Foster, Emma Warwick	Dom.Sci.S.	90	68½	Higbys
Foster, John Cook, Jr.	Agr. S.	98	61+1½	Higbys
Foster, Michael Leander	Dairying	...	...	Axtel
Frank, John Nicholas	Agr. S.	98	32+4	North Amherst
*Galehouse, David William	Agr.	206	142	Doylestown
*Gibson, Herbert R.	Agr. S.	98	34+48	Camp Chase
*Gladding, Maynard Marcus	Agr.	206	93	Windsor
Graber, Christian	Dairying	...	...	Burton
*Hamilton, Frank Edward	Agr.	206	93	Brownsville
Hanna, Charles Mitchell	Agr. S.	98	47	Tiro
*Hard, Jesse M.	Agr.	210½	21	Olentangy
Harper, Merritt	Agr.	206	150	Grove City
Hatfield, Clifford Christian	Agr. S.	98	52	Lebanon
Hayden, Cassius Clay, B. Sc.	(Agr.)	...	...	Oakdale
Heller, John	Dairying	...	...	Ona, W. Va.
Henderson, Harry Harold	Agr. S.	98	16	West Cairo
*Hess, Flora Louise	Dom. Sci.	203	65	North Columbus
*Hill, Mamie Faye	Dom. Sci.	203	116	Columbus
*Holloway, Carrie	Dom. Sci.	203	50	Columbus
Holt, David C.	Dairying	...	...	Galloway
Hoover, Clarence Boal	Agr.	210½	46½	Venice
*Hoover, Edna Brown	Dom. Sci.	202½	24	Columbus
Hunt, Jay Horatio	Dairying	...	...	Columbus
Hyatt, James Vernon	Agr. S.	98	44	Augusta
Immell, Woodford Elias	Agr. S.	98	29+3	Chillicothe
Innis, Byron Schofield	Agr. S.	98	51	Wagram
*Irwin, Arthur Milton	Agr.	210½	37½	Parkman
*James, Harold Francis	H. & F.	210½	32½	Pekin, China
Jennings, Otto Emery	Agr.	206	93	Olena
Jones, Lloyd	Agr. S.	98	98+7½	Columbus
Karrer, Carl	Agr. S.	98	5	Dublin
Kaylor, Rollie Washington	Dairying	...	...	Bellefontaine
*Kelley, William Lester	Agr.	206	85	Newark
Kinney, Charles C.	Dairying	...	...	Yellow Springs
Klein, Edith May	Special	...	11	Columbus
Kynett, Albert Gardner	Dairying	...	...	Collier, W. Va.

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Ladrach, John J.	Dairying	...	...	Birmingham
Langdon, Elmer	Agr. S.	98	63+3	Sabina
Lanman, Faith Robinson	Dom. Sci.	202½	52½	Columbus
Lindley, Lulu	Dom. Sci.	202½	38	Fredericktown
*Linsley, Frank Preston	Agr.	210½	15½	Gallipolis
*Long, Frank C.	Agr.	206	73	West Sonora
Mallow, Harry Campbell	Agr. S.	98	40	Washington C. H.
Marshall, Ida	Dom. Sci.	203	89	Hemlock
Mason, Arthur Devillo	Agr.	206	119	Wellington
Mears, William Holt	Agr. S.	98	48+3	Moscow
Meek, Eunice	Dom.Sci.S.	90	45	Afton
Meiche, Louis	Agr. S.	98	98+7	North Royalton
Mesloh, Harry Smith	Agr. S.	98	55	New Bremen
Miller, Merritt Finley, B. Sc.	(Agr.)	...	...	Ridpath
Miller, Maynard Everett, B. Sc.	Dairying	...	...	Dodgeville
Miner, Charles Austin	Agr. S.	98	98+16	Bristolville
Mooney, Charles Napoleon, B. Sc.	(Agr.)	...	...	Milan
Murray, Edna Earl	Dom. Sci.	203	132	Columbus
*McAlister, Lee Paden	Agr.	210½	31	Thornville
McCall, Arthur Gillet, B. Sc.	(Agr.)	...	...	McGraw
McClelland, Chester Arthur	Agr.	210½	48	Terrace Park
McKinley, Ira Esdras	Agr. S.	98	20	Vaughnsville
McMahon, Mary Gertrude	Dom.Sci.S.	90	80½	Columbus
*McOwen, James Jr.	H. & F.	206	157	Ovid
*Neill, Nelson Prentice	Agr.	206	150	Venice
Nelson, Fred Burgess	Agr. S.	98	79	Coe Ridge
Nelson, Fred Walker	Agr. S.	98	52	Salem Center
Nelson, Homer Thrall	Agr. S.	98	...	Selma
Oliver, Charley Ray	Dairying	...	...	Portersville, Pa.
Orton, Louise Taft	Special	...	4	Columbus
Osborn, Alice	Dom.Sci.S.	90	90+43	Cadiz
*Osborn, Harry Lester	Agr.	210½	48	Chardon
Oswald, Rudolph	Dairying	...	...	Aurora
Perry, Elma Brooks	Dom. Sci.	203	176	Troy
Perry, John Cole	Agr.	206	165	Columbia Station
Peters, Frances Bush	Dom.Sci.S.	94½	44½	Columbus
Poindexter, Charles Cardoga	Agr.	210½	51½	Park'sb'g, W.Va.
Postle, Stuart A.	Dairying	...	...	Camp Chase
Richards, Don Arthur	Dairying	...	...	Medina
*Riley, Valeria	Dom. Sci.	203	131	Washington C.H.
*Ruhlen, La Mott	Agr.	206	104½	Plain City
*Schaeffer, Freelan Wilbert	Agr.	206	188	Spanker
*Scott, Edith Clare	Dom. Sci.	202½	26	Mt. Pleasant
Senter, Pearl	Special	...	45	Shepard
Shaffer, Jesse	Dairying	...	...	Black Lick
Shaw, Edward Lee	Agr.	206	108	Newark
Shepard, Allen Day	Dairying	...	...	Conneaut
*Sigrist, John Larkum	Agr.	206	107½	Congress
*Skiles, Blanche Gertrude	Dom. Sci.	203	115	Shelby
*Smith, Wilford B.	Agr.	210½	36	Chesterhill
Snyder, Addison Hogan	Agr.	206	158	Tacoma

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Stahl, Price Ewing	Agr. S.	98	47+2½	Jewett
Steward, Charles Benjamin, B. Sc.	(Agr.)	...	...	Marcy
Stiers, Thomas Vernon	Agr. S.	98	26	Zaleski
Sumner, Mrs. R. M.	Special	...	12	Columbus
Taylor, Frederick Wellington, B. Sc.	(Agr.)	...	...	Wooster
Thomas, Elmer Ellsworth	Dairying	...	...	Newark
Thompson, Jesse Eugene	Agr. S.	98	53	Bristolville
Trowbridge, Warner Wesley	Agr. S.	98	98+6	Painesville
Tyler, Fred J., B. Sc.	(H. & F.)	...	...	Perry
*Walker, William	Agr.	210½	36	West Canaan
Wampler, Milton Eugene	Agr. S.	98	55+3	Dayton
Weisman, Laura Anna, B. Sc.	(Dom.Sci.)	...	...	Columbus
Wheeler, Leroy Thomas	Agr. S.	98	58+6	Chillicothe
Williamson, Frances Glade	Dom.Sci.S.	94½	36	Columbus
Wolfe, La Verne Florence	Dom.Sci.S.	94½	45	Lucas

* Preparatory work incomplete.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

GRADUATE STUDENTS—25

Allen, Lucy, B. A., 1897.....Columbus
Barrows, Sarah Tracy, M. L.....Columbus
Blakiston, Mary, B. Ph., 1893.....Columbus
Bohn, William Edward, B. A. (German Wallace College).....Olmsted Falls
Brown, Harold Warner, B. Sc. (Cornell University).....Oberlin
Collett, Samuel William, M. Sc. (Moore's Hill College).....Columbus
Converse, Edward Jasper, B. A., 1886, B. D. (Yale University).....Columbus
Doney, Carl Gregg, B. Sc., 1891, LL. B., M. A.....Delaware
Good, Paul Revere, B. A., 1899.....Westerville
Gore, Herbert Charles, B. Sc. (University of Michigan).....Chicago, Ill.
Hannum, William H., B. A., 1887.....Columbus
Hirst, Anna Brewster, B. A. (Antioch College).....Yellow Springs
Huddleson, Don Carlos, G. Ph., 1897.....Columbus
Jeffrey, Maude Dorothy, B. Ph., 1895.....Columbus
Kirby, Harriet Rebecca, B. A., 1898.....Columbus
Maag, Benjamin (Wooster University).....Mt. Eaton
Machwart, Washington J., B. S. (Muskingum College).....Mt. Eaton
Mann, Wilbur Edwin, B. Ph., 1899.....Columbus
Milligan, Mrs. Clara F., B. A., 1886.....Columbus
Parker, John Bernard, B. A., 1898.....Danville
Raymond, Maude, B. Ph., 1899.....Columbus
Robinson, Zella Vina, B. Ph., 1898.....Columbus
Rogers, Ellen Chapin, Ph. B. (University of Michigan).....Grand Rapids
Williams, Herber Oswald, B. A., 1894.....Columbus
Young, John Wesley, B. Ph., 1899.....Columbus

UNDERGRADUATES—419

	Course	Course Hours	Credit Hours	Home Address
Abbott, Roy A., B. Ph.	.....	...	...	Columbus
*Adams, Elizabeth Jane	Arts	126	68	Columbus
*Adams, Margaret E.	Arts	126	58	Columbus
*Adamson, James Manley	L. & J.	99	15	Dayton
*Aldrich, Wesley Richard	L. & J.	99	17	Columbus
*Althauser, Louis Girod	Arts	127	...	Kenton
*Alward, Benjamin Clyde	E. Ph.	129	12	Pataskala
Andress, Edna Alice, B. Ph.	.....	...	...	Birmingham
*Andrews, John Davis	Arts	127	9	Hamilton
Armstrong, Dan Hinkle	Special	...	33	Jackson
Ash, Ray Charles	Prep. Med.	100	54	Ashland
Baldwin, Mabel Dennison	Special	...	13½	Columbus
*Ball, Danforth Ewers	Science	135	111	Columbus
*Ball, Ernestine Faye	Arts	127	32	Columbus
*Ballard, Marion Imrie	L. & J.	99	...	Canton
Barcus, Eliza, B. A.	.....	...	...	Columbus
*Barnet, Clarence Elwood	Special	...	80	New Paris
*Bartram, Faith Alberta	L. & J.	99	22	Columbus
Bauman, Samuel	Special	...	31	Birmingham
Beck, Edwin Long	L. Ph.	126	92	Lithopolis
*Beebe, Carl Vorhees	L. & J.	99	3	Mt. Gilead
*Beer, James Anderson	Prep. Med.	100	61+20	Ashland
Beery, Harry Reber	Arts	127	24	Canal Winchester
Bell, Florence Louise, B. Ph.	.....	...	...	Columbus
Bell, Mary Edith	Special	...	11	Columbus
*Bellows, Gertrude Halm	E. Ph.	128	65	Columbus
*Bigelow, Bernard Barton	L. Ph.	127	30	Findlay
*Bigelow, Hosea Bradley	Arts	127	24	Columbus
Bittner, William Pitt	L. & J.	98	68+2	Sandusky
Bohn, Frank, B. Ph.	.....	...	...	Olmsted Falls
Bonnet, Alvin Cook	Arts	127	33	Columbus
Booth, Carl Howard	L. Ph.	127	25	Columbus
*Booth, Cora Vrooman	L. Ph.	126	52	Columbus
*Booth, George Hamilton	L. Ph.	127	4	Columbus
Bostwick, Homer Z., B. A.	.....	...	...	Columbus
Bostwick, Valeria	Arts	126	64	Columbus
*Bower, Alice Ethel	E. Ph.	129	...	Worthington
*Bowles, John Porter	L. & J.	98	65	Columbus
Bradford, Frances Elizabeth	E. Ph.	129	29	Columbus
*Braun, Bertha Elizabeth	M. L. Ph.	127	...	Columbus
*Bridge, Effie Irene	Arts	127	33	Columbus
Brooks, Stanley Grange	Science	133	70	Columbus
Brown, Alexander Lackey	Special	...	...	Catlettsburg, Ky.
Brown, Jessie L. P.	Arts	126	60	Columbus
Brown, Winfred	Special	...	...	Moscow
*Bryant, William Cheney	L. Ph.	126	65	King's Creek
*Buck, Ralph William	Science	132	29	Cardington
*Bulen, Elwood Joseph	Com. & Ad.	131	5½	Columbus
Burgess, James Henry, B. Ph.	.....	...	...	Big Horn, Wy.

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Burgess, Norman Almon	Prep. Med.	100	16½	Parkman
*Burkey, Charles Paul	Special	...	41+11	Pleasantville
*Burr, Mary	E. Ph.	129	29	Worthington
Butler, Blanche Woodruff	Arts	126	102	Wellsville
*Cannon, Anna Cathrine	L. & J.	98	86+11	Columbus
Carpenter, Jessie Marie	E. Ph.	128	66	Columbus
Carson, Nellie Eliza	L. Ph.	126	86	Harrisburg
Chamberlain; Robert M	Science	133	92	Columbus
*Chaney, James William	E. Ph.	128	77	Columbus
*Clagett, Arthur E	Science	135	66	Dayton
*Clapp, Katharine B	Special	...	64	Norwalk
*Clevenger, Charles Henry	Science	131	55+19	Fletcher
*Clevenger, Joseph Franklin	Science	131	57	Fletcher
*Coad, James Earl	L. Ph.	127	12	St. Lewisville
*Coates, Elmer William	Arts	127	25	Pomeroy
Cockerill, Orville Porter	Special	...	75	Washington C. H.
*Coe, Bertha L	Special	...	12	North Columbus
Cole, Fred	M. L. Ph.	127	18½	Zanesville
Colgan, Lillian Katharine	Special	...	71	Columbus
Collins, Walter Scott	Arts	126	95	Columbus
*Compton, Edward Cass	L. & J.	99	27+12	Coshocton
*Connolley, Augusta	L. Ph.	126	72	Columbus
Connor, Alice Marie, B. Ph	.....	...	...	Columbus
Connor, Ellen Josephine, B. Ph	.....	...	...	Columbus
*Connors, John Leo	L. & J.	99	14	Columbus
Cooke, Levi	Arts	127	20	Columbus
*Corkery, Thomas Jefferson	Arts	127	25	Toledo
Corner, Edith	L. Ph.	127	87	Columbus
Cottom, Frank W	Prep. Med.	100	59+6	Dayton
Courtright, Elizabeth Pauline	Arts	128	107	Columbus
Courtright, J. Loring, B. A	.....	...	...	Circleville
Courtright, Stella Van	L. Ph.	126	96	Columbus
Coy, William Stacey	Arts	127	30	Columbus
Craig, Francis Miron	Special	...	25	Clarion
*Cunningham, Charles Gilman	E. Ph.	128	103	Fostoria
*Davidson, Harold Glenn	L. & J.	99	20	Dayton
*Davidson, Ruth Emily	E. Ph.	129	23½	Chicago, Ill.
*Davis, William Edgar	Arts	128	64	Columbus
Dean, Wilbur Spencer	Special	...	97	Warsaw
*Dean, Ethel Sourbray	L. & J.	99	41	Columbus
*DeNune, Ethel	Arts	126	58	Columbus
Derby, Alice G	L. Ph.	126	101	Columbus
Dickinson, George Codwice	Arts	126	89	Columbus
*Diehl, William Ross	E. Ph.	129	...	Columbus
Dill, Augusta Dille, B. Ph	.....	...	...	Columbus
Dollison, Harvey Clinton, B. Sc	.....	...	...	Zanesville
*Dolson, Benjamin Reimmund	L. & J.	99	25	Lancaster
Donovan, Dennis Aloysius	E. Ph.	128	78	Columbus
Dow, Mary Edna	Special	...	...	Bellefontaine
Dowd, Charles Fuller, B. Ph	.....	...	...	Toledo
Dubois, Wilbur L., B. Sc	.....	...	...	Cincinnati

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Dufour, Alice	Special	...	93	Columbus
Durbin, Samuel Clyde	E. Ph.	128	100	McConnelsville
Dyer, Clarkson Werter	Arts	127	25	Plano
Eagleson, John Hervey, B. A.	.....	...	...	Columbus
Eagleson, Joseph Pentecost, B. A.	.....	...	...	Columbus
*Eastman, Katharine	L. Ph.	127	27	Columbus
Easton, Ernest Doane	B. Sc.	129	77	Springboro
*Ebright, Bessie	E. Ph.	129	17	Columbus
Edwards, Norma	Special	...	27	Columbus
Eisenbise, Bertha, B. Ph.	.....	...	...	Columbus
Enderlin, Louis Charles	Special	...	...	Allegheny, Pa.
Ewalt, Clara Converse	E. Ph.	130	100	Columbus
*Farrar, Morton	L. Ph.	127	...	London
*Ferenbaugh, Burchard Blaine	Arts	127	33	Buckeye City
*Fink, Henry Emil	L. & J.	99	30	New Bremen
Fisher, Ida May, B. Ph.	.....	...	...	Columbus
Follett, Mary Pelton	L. Ph.	127	33	Columbus
Foster, Asa Emmanuel	Arts	126	58	New Salem
Fox, Ross Garfield, B. Ph.	.....	...	...	Columbus
Frederick, Albert Augustus	Special	...	...	Millersburg
French, Louis Vincent	E. Ph.	129	22	Jefferson
*Fullerton, Rutherford	L. & J.	99	33+3	Columbus
*Game, Francis Harvey	E. Ph.	128	60	Canal Winchester
Gamper, Hattie, B. Ph.	.....	...	...	Columbus
Gardner, Blanche	Arts	127	...	Columbus
Garman, Susan Editha	E. Ph.	131	41	Dayton
Gauch, James Arlando	Arts	126	64	West Manchester
Gayman, Charles Welton, B. Ph.	.....	...	...	Canal Winchester
Ginder, Floyd Edwin	Prep. Med.	100	25	Lancaster
*Godman, Leroy Hayes	L. & J.	98	57	Columbus
*Gordon, Earl Augustus	Prep. Med.	100	34	Junction City
*Gordon, Sarah Bryarly	Special	...	86	St. Mary's
*Gorham, Ira Garfield	Arts	126	44	Perrysville
*Graham, Reuben Jacob	E. Ph.	128	77	Northup
Greener, Gussie Howe	L. Ph.	126	102	Columbus
Griggs, Robert Fiske	Science	130	41	Columbus
Guittard, Claude B.	M. L. Ph.	126	41	New Bedford
Haecker, Christofer Frederick	Special	...	31	Sandusky
Hagenbach, George Edwin	L. Ph.	127	25	Urbana
Hahn, George Philip	Com. & Ad.	131	33	Napoleon
Hambleton, Ethel Ada	L. Ph.	126	91	Columbus
*Hambleton, Charles Reverdy	E. Ph.	129	2½	Hooksburg
*Hammond, Harvey George	L. & J.	99	...	Millwood
*Harbine, Sarah Smith	E. Ph.	129	41	Xenia
*Hard, Ansel Shallcross	L. & J.	99	22½	Bowling Green
Hardy, Caroline Church	Special	...	48	Columbus
Harward, Arthur Byron, B. A.	.....	...	...	Columbus
Hatcher, Wesley	Special	...	...	Raymond
*Hauk, Will Comrie	Arts	126	101	South Charleston
Heitman, William L.	Science	132	29	New Bremen
Henderson, Herbert B.	Special	...	91	Laceyville

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Hensel, Donald Dean	Com. & Ad.	131	69	Eaton
Herrick, Sara Ethel	E. Ph.	128	83	Wellington
*Herrman, Bessie	E. Ph.	128	69	Worthington
Hertlein, Alice Kelley	Special	...	6½	Sandusky
*Hicks, Blanche	L. Ph.	129	27	Centerburg
Hicks, Nellie	Arts	128	99	Centerburg
*Hickey, Thomas Owen	Prep. Med.	100	...	Caylick
Hirsch, Rudolph	Science	133	91	Columbus
Hite, Bertha	Special	...	14	Columbus
Hoffmann, Hattie DeLong, B. Ph.	.....	...	...	Columbus
*Holcomb, Harry John	Arts	128	90	Columbus
*Hommon, Harry Britton	E. Ph.	129	17	Marble Cliff
Honline, Mose A.	Special	...	50	Columbus
Hopkins, Bertha Marie	L. Ph.	126	64	Columbus
Hopkins, Clara M.	L. Ph.	126	61	Columbus
Hopkins, Edith Estelle	L. Ph.	126	65	Columbus
Houghton, Henry Spencer	Special	...	99	Columbus
Howard, Anna Faye, B. Ph.	.....	...	...	Columbus
*Hubbard, Desha Darling	L. Ph.	127	19	Columbus
Huddleson, Mabel Lee	Special	...	9	Columbus
Hudson, Clara Putnam	E. Ph.	128	58	Middleport
Huling, Frank	Arts	127	26½	Columbus
Humphrey, Stella Hale	Special	...	40½	Peninsula
Hungelmann, Arthur	Science	129	74	Columbus
*Hunt, Mary Fulton	L. Ph.	126	90	Columbus
Hunter, Anna Eliza	M. L. Ph.	126	66	Columbus
*Hunter, Joseph Symmes	Arts	126	87	Seven Mile
Hurst, Louise Kate	Special	...	17	Piketon
*Huston, Frank Arilda	M. L. Ph.	126	87	Columbus
*Jacoby, Benjamin	Science	130	33	Marion
*Jacoby, Ethelwyn	Arts	127	22	Columbus
Jacoby, Mrs. S. C.	Special	...	17	Columbus
Jaynes, Allan Brown, B. Ph.	.....	...	...	Columbus
Jeffrey, James Fred, B. Sc.	.....	...	...	Columbus
Jefferey, John Ralston	Special	...	80	Huron
*Jennings, Elma	M. L. Ph.	126	65	Eaton
*Jones, Daniel C.	E. Ph.	128	60	Jackson
*Jones, Gilbert Haren	Arts	127	27½	Columbus
*Jones, John William	E. Ph.	128	87	Jackson
Jones, Richard Thomas, B. Ph.	.....	...	...	Columbus
Jones, Victor Waite	E. Ph.	128	88	Columbus
*Jordon, Homer Garfield	Arts	127	22½	Columbus
*Justice, Charles Lloyd	Arts	126	22	Leipsic
Karshner, George Melville, B. A.	.....	...	...	Columbus
Kauffman, Margaret Glenn	M. L. Ph.	126	78	Columbus
Kauffman, Henrietta Christine	M. L. Ph.	126	92	Columbus
Keiser, Forest Le Grand	Science	130	22	Bryan
Kennedy, Herbert Welles	E. Ph.	128	...	Coe Ridge
Kerr, May Lizzie	E. Ph.	129	25	Rushville, Ill.
*Kimball, Mabel Fawn	E. Ph.	129	19½	Woodstock
Kinder, Gordon Donald, B. Ph.	.....	...	...	Ottawa

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
King, Bernice	Arts	126	48	Columbus
Kirk, George Barlow	Arts	126	82	Columbus
Klein, David, B. Ph.	.....	...	...	Columbus
Knight, Caroline Estell, B. Ph.	.....	...	...	Columbus
Knight, Margaret Amanda	Special	...	28	Columbus
Kohl, Clayton Charles	L. Ph.	126	90	Perryburg
*Kohr, Paul Homer	Arts	127	26½	Columbus
Lambert, Elza Jay	Special	...	33	Plantsville
Latimer, Thomas Erwin	L. & J.	99	25+3	Hilliards
*Lawrence, Osa Alonzo	M. L. Ph.	127	37	Oxford
*Leeper, Charles	E. Ph.	129	3	
*Lentz, Florence	M. L. Ph.	126	80	Marysville
Leonard, Hannah Margaret	L. Ph.	127	19	Columbus
†*Lincoln, Elsie	E. Ph.	129	17½	Woodstock
Lisle, Charles Howard, B. Ph.	.....	...	...	Pataskala
Lisle, Thomas G.	Com. & Ad.	131	22	Columbus
Long, Mila Myrtle	Special	...	2½	Columbus
Loren, Mary	Special	...	40	Columbus
*Loughrey, John Larison	L. & J.	99	15½	Marysville
Luse, Jessie Edna	E. Ph.	128	99	Columbus
Lyon, Maud Eliose	Special	...	29	Westfield, N. Y.
MacAdam, Lida Allison	Special	...	8	Worthington
Mack, Egbert Hiram	E. Ph.	129	30	Sandusky
Mark, Mary Louise	Arts	127	35	Columbus
Marriott, Robert Henry	Science	129	89	Richwood
*Martin, Franklin Ewing	L. Ph.	127	7	Columbus
Martin, William Kooken	L. Ph.	127	25	Lancaster
Martz, Velorus	Arts	126	103	Columbus
*Matthews, Max Moses	E. Ph.	129	49	Vinton
Mayfield, Victor Hugo	Special	...	3	Prospect
Meade, Caroline Annis	M. L. Ph.	126	78	Columbus
Merkle, Albert Edward	Prep. Med.	100	31	Chillicothe
*Merrick, Lawrence Hildreth	Arts	127	22½	Zanesville
*Miesse, Frank H.	L. Ph.	127	49	Chillicothe
Miller, Albert Morris	Special	...	22	Columbus
*Miller, Charles Reed	E. Ph.	128	57	Bellville
Miller, Fred A.	E. Ph.	128	104	Columbus
Miller, Gretchen Pauline, B. Ph.	.....	...	...	Columbus
*Miller, Paul Scott	Science	130	24½	Marion
Mills, Donald P.	Special	...	36	Norwalk
Mitchell, Lynn Boal	Arts	127	41	Piqua
Mitzenberg, Allena May	L. Ph.	126	94	Columbus
Mitzenberg, Fannie Katheryn	L. Ph.	127	33	Columbus
Mock, Marcia Inez	L. Ph.	126	102	Columbus
Malloy, Mary Aloysia	L. Ph.	127	25	Sandusky
Maloney, William Patrick	Special	...	72	Prospect
Moon, Clarence Victor, B. Ph.	.....	...	...	Farmer's Station
Moore, Clarence L. E.	Science	129	98	Washington C. H.
Moore, Edgar Howard, B. Sc.	.....	...	...	Columbus
*Morgan, Roy	E. Ph.	128	70	Greenland
Morse, Max Withrow	Science	130	27	London

† Died March 18, 1900. * Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Morton, Max De Los	Special	...	33	Ashtabula
*Muirie, Frederick John	Arts	126	61	Youngstown
Mull, Ernest Clinton	L. & J.	99	30	Lebanon
Mumma, Marion W	Science	133	108	Dayton
McAllister, Earl Saddler	E. Ph.	128	86	Columbus
McAlpine, Maude A	Special	...	12	Columbus
McCallum, Raymond, B. Ph	.....	...	...	Dayton
McDonald, Joseph Slyvester	E. Ph.	128	98	Rendville
McDowell, James Keen	L. Ph.	127	41	Columbus
*McGugin, Elizabeth Winifred	Arts	127	45	Ohio Furnace
*McKinley, Mary Ann	L. Ph.	127	19½	Trinway
McKinney, Frank C	Arts	126	108	Columbus
McPherson, Clarence Githeus	Science	130	...	Xenia
*McQuigg, Charles Wesley	L. & J.	99	15+8	Pomeroy
*Nachtrieb, Clarence R	L. Ph.	127	22½	Wauseon
Nash, Simeon	Arts	126	103	Columbus
*Needles, Ada Ruckle	Science	129	38	Groveport
Neiswender, Lisle W	Prep. Med.	100	68+2	Grove City
Nichols, Ada May	M. L. Ph.	126	68	Chillicothe
*Nida, William Lewis	E. Ph.	128	92	Lincoln
Norris, John S	M. L. Ph.	126	80	Columbus
*O'Brien, Charles Francis	L. & J.	99	33	Urbana
*Orndorf, Earl Luther	E. Ph.	129	35	Wauseon
*Ortman, Earl Hill	L. Ph.	127	25	New Salem
Orton, Samuel Torrey	Science	133	83	Columbus
Osborn, Abner Andrews, B. Sc	.....	...	...	Columbus
Parmenter, William Watt, B. A	.....	...	...	Mt. Vernon
Parsons, George McLellan	L. Ph.	126	98	Columbus
Patterson, Bertha Gildersheve	Arts	126	105	Columbus
*Pavlicek, Frank J	L. Ph.	126	85	Toledo
*Peoples, Emmet W	Arts	126	21	Pomeroy
Pitts, Grace Lenore, B. Ph	.....	...	...	Columbus
*Plum, Harley Martin	Arts	126	67	Ashville
Plummer, Alice Greenwood	Special	...	17	Columbus
*Pocock, Lucy Hunt	E. Ph.	128	68	Columbus
Porter, George Henry	L. Ph.	126	98	New Philadelphia
*Postle, Carlton David	Prep. Med.	100	33+6	Alton
Postle, Carl Haldy	Com. & Ad.	131	17	Columbus
Potts, Beulah Josephine	Arts	127	29	Columbus
*Potts, Helen Georgiana	Special	...	32	Columbus
Powell, Blanche	Special	...	...	Mt. Cory
*Powell, Cornelia	Arts	127	60	Columbus
*Powell, Raymond Thompson	L. Ph.	127	6	Columbus
*Pratt, Edna Stuart	Arts	127	...	Columbus
Pulling, Margaret Glaze, B. Ph	.....	...	...	Columbus
Pumphrey, Josiah Merton	Prep. Med.	100	64	Martinsburg
*Rathburn, James Irwin	Prep. Med.	100	16	Gallipolis
*Raymond, Maybelle	E. Ph.	128	77	Columbus
*Raymond, Stockton	L. Ph.	127	22	Columbus
Redrow, Clara M	M. L. Ph.	126	50	Williamsburg
Redrow, Walter Leffingwell, B. Sc	.....	...	...	Williamsburg

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Rees, Edith Celeste	Arts	126	104	Columbus
*Reese, David R	Arts	126	94	Shawnee
Reinhard, Frank J., Jr	E. Ph.	128	40	Columbus
Reütinger, Ernest Victor	Prep. Med.	100	62+8	Chillicothe
Rice, Mary Washington, B. A	.....	...	...	Columbus
Rickard, Alexander	Special	...	5	Columbus
Rickey, Tallmadge Archer, B. Ph	.....	...	...	Columbus
*Ridenour, Walter Ashton	L. & J.	98	52+13	Jackson
*Robinson, John Fletcher	Prep. Med.	100	26+5	Columbus
*Rockey, Noble Warren	E. Ph.	129	21	Dayton
*Rodebaugh, Mabel Mary	M. L. Ph.	127	22	Marysville
Roebuck, Carl Fletcher, B. Ph	.....	...	...	Dalton
Roekel, Frederick Augustus	Prep. Med.	100	27	Zanesville
Roney, Mary Malvina	L. Ph.	126	103	Columbus
Ruebesh, Joseph Keiffer	Special	...	31½	Dayton
*Rushton, Norman	Com. & Ad.	131	56	Selkirk, Ontario
*Sadler, Anna Belle	L. Ph.	126	74	Columbus
Salm, Edna Esther	L. Ph.	127	39	Columbus
Sayre, Charles Boyd, B. A	.....	...	...	Columbus
Schaff, Mae B., B. Ph	.....	...	...	Columbus
*Schantz, Albert J	Science	135	66	Dayton
Schilling, Emelia Jahana	Special	...	10	Columbus
*Schneider, Earnest True	L. & J.	99	25½	Dayton
Schoedinger, Ferdinand P	Arts	126	74	Columbus
*Schönthal, Derso Clarence	E. Ph.	128	60	Columbus
Scott, Dudley, B. Ph	.....	...	...	Columbus
*Seymour, Edith Lillian	Arts	127	27	Columbus
Seymour, Raymond Jesse, B. Sc	.....	...	...	Columbus
*Schaeffer, Ray	Arts	127	19½	Coshocton
*Shaw, Harry R	E. Ph.	128	85	Zanesville
*Sherman, Richard Jay	Arts	127	35	Toledo
Shigley, Anna B	Special	...	29	Jamestown
Simpson, Warner Pike	Prep. Med.	100	34	Worthington
Singleton, Charles T., B. Ph	.....	...	...	Columbus
Smith, Albertine Charlleen, B. Ph	.....	...	...	Columbus
*Smith, Harold Osborn	L. Ph.	126	64	Columbus
Smith, Lida May	Special	...	1	Columbus
Smith, Ralph Harvey	Prep. Med.	100	19	Columbus
Smith, Stanley Robb	Special	...	18	Columbus
Smith, Virginia Roletta, B. Ph	.....	...	...	Columbus
*Snyder, Henry Williams	E. Ph.	129	24½	Ironton
Souder, Charles Granville	Science	130	5½	Logansport, Ind.
*Southwick, Myrtle Minerva	E. Ph.	129	16	Kendallville, Ind.
*Southworth, Ruth	E. Ph.	129	27	Columbus
Sperry, Wilmot, Jr	E. Ph.	128	91	Mt. Vernon
Sproat, Martha Evans	L. Ph.	127	37	Columbus
*Staley, Homer F	Arts	126	48	Columbus
Stephenson, Bertram Sheaver	L. Ph.	126	96	Jackson
*Stevenson, Ray David	Special	...	62	Fostoria
*Steward, James Clarence	E. Ph.	129	29	Marcy
*Stewart, George Francis	L. & J.	99	9½	Coshocton

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
*Stewart, Gilbert H., Jr.	L. & J.	98	47	Columbus
Stimson, George, B. A.	.....	...	...	Columbus
*Stults, Newton Delano	E. Ph.	129	...	Fremont
Sullivan, Oscar M.	Arts	126	72	Columbus
Swaney, Sara C.	L. & J.	98	61+1	East Liverpool
*Swift, Samuel Ferguson	E. Ph.	128	47	Jackson
*Tarbill, John Wesley	Arts.	126	114	Atlanta
*Tatje, Oral D.	Prep. Med.	100	34	Columbus
Taylor, Bessie Battelle	L. Ph.	126	70	Columbus
*Taylor, Mary Hill	L. Ph.	127	33	Columbus
*Taylor, William Harry	E. Ph.	128	74	Columbus
Teter, Sumner	Science	129	63	Columbus
*Teter, Millicent	M. L. Ph.	127	12	Columbus
Thomas, Lawrence David, B. Ph.	.....	...	...	Lancaster
Thomas, Robert Park.	Special	...	...	Kennard
*Thompson, King Gibson	Special	...	74	Georgetown
*Thompson, Roy Washington	L. Ph.	127	27	Gallipolis
Tietjens, Otto	Com. & Ad.	131	...	Napoleon
Tilden, Samuel Jay	Special	...	28½	Garrettsville
*Tilton, Josephus Howard	E. Ph.	128	110	Jelloway
Timberman, Andrew	Special	...	...	Columbus
Tipton, Robert	Special	...	...	Milo
Trauger, Bertha Elizabeth	Special	....	6	Columbus
Trauger, Clara Salome	Special	...	7	Columbus
Travis, Fred L., B. A.	.....	...	...	Pana, Ill.
Travis, John F., B. A.	.....	...	...	Green Camp
Türcke, Therese	Special	...	12	Columbus
Turner, Bertha Louise	M. L. Ph.	126	38	Columbus
Turner, Lucile E.	Special	...	...	Columbus
*Ulsamer, Fritz Martin	M. L. Ph.	127	5½	Gallipolis
*Veach, Esther Louise	E. Ph.	129	23½	Newark
Vinson, Albert E.	Special	...	116	Dayton
Wagner, Charles John	Special	...	13	Belle Centre
Wallace, William Garvey	Special	...	...	Bellefontaine
Walsh, Frances Lyon	Arts	126	40	Columbus
Walters, Barton	Special	...	32	Circleville
Ward, Annette Persis	Special	...	26	Columbus
*Ward, Lila Lucile	L. Ph.	126	90	Reynoldsburg
*Warner, John Howell	Arts	127	25	W. Shelby, N. Y.
Waugh, Helen Grace	L. Ph.	129	16	Bowling Green
*Weaver, Mima Jacobs	E. Ph.	131	41	Dayton
Weber, Sophia Frances	Special	...	31	Columbus
Weick, Carrie Rosina	Science	129	104	Columbus
Weld, Harry Porter, B. Ph.	.....	...	...	Marysville
*Weller, Charles Ralph	L. Ph.	127	...	Portsmouth
Welling, Faith Cornelia	Arts	126	94	Worthington
*Wells, Byron Bliss	Science	129	59	Ostrander
*Wells, Harry B.	Arts	126	40	Columbus
West, Earle Downs, B. A.	.....	...	...	Columbus
Whetsel, James Anderson Garfield	Arts	127	30	Columbus
*Whitaker, William Earl	E. Ph.	128	99	Wauseon

* Preparatory work incomplete.

	Course	Coursé Hours	Credit Hours	Home Address
*White, Carroll Agnew	L. Ph.	126	45	Marysville
Whiteside, John Wesley	E. Ph.	128	93	Bloomingburg
Wilkinson, John Anderson	L. Ph.	127	33	Piqua
*Williams, Anna Florence	E. Ph.	129	26	Jackson
Williams, Clara Maude, B. Ph	.....	...	...	Columbus
Wilson, Charles Robert	L. & J.	99	26	Circleville
*Wilson, Willard Aleck	Com. & Ad.	131	25	Columbus
Wing, Lucius Arthur	Science	130	35	Columbus
*Woods, William Burroughs	L. & J.	99	36+3	Garrettsville
Wright, Nellie	E. Ph.	128	80	Worthington
Yoder, Harvey Elmer	Special	...	11	North Industry
*Young, Claude Burnett	L. Ph.	127	27	West Rushville
*Young, Mary Grace, B. Ph				Mt. Vernon

* Preparatory work incomplete.

COLLEGE OF ENGINEERING

GRADUATE STUDENTS — 11

	Course	Home Address
Edwards, Clarence J.	Cer. S.	Newberg, Ore.
B. S. Pacific College.		
Ford, Nile Otis	E. M.	Wheeling, W.Va.
A. B. Washington and Jefferson.		
Grate, Charles A.	M. E.	Yale.
M. E. Ohio State University.		
Groves, John Wesley	E. M.	Batavia.
C. E. Ohio State University.		
Hale, Frederick James	M. E.	Mogadore.
M. E. Ohio State University.		
Ludlow, Stephen H.	*Cer	Union City, Ind.
B. S. Albion College.		
McIntire, Alfred Heber	M. E.	Mt. Vernon
E. E. Ohio State University.		
Schlochtermeyer, Carl Fred	E. E.	Cincinnati
A. B. St. Xavier College.		
Somermeir, Edward Everett	E. M.	Westwood
G. Ph. Ohio State University.		
Williams, Ira A.	*Cer	Ames, Iowa
B. S. Iowa State College.		
Wynne, Francis Edmund	E. E.	Bethany, W. Va.
B. A. and M. A. Bethany.		

* Pursuing a special course.

UNDERGRADUATES — 394

	Course	Course Hours	Credit Hours	Home Address
Albin, Carl	E. E.	219½	52	Columbus
Alford, Arthur Milton	M. E.	22	138+4	Windham
*Ames, Holiday	C. E.	209	34+3	Ashland
*Archer, Carl Hunter	E. E.	219½	...	Columbus
Armstrong, Hugh Cook	E. E.	219½	43½+3	Clintonville
Arndt, Mrs. Mary Korst	Special	...	2	Columbus
*Arnold, Charles H	M. E.	222	91	New London
Bahrke, Charles Frederick	I. A., S.	96	35	Columbus
Bailey, Ervin George	E. E.	218	92	Damascus
*Bailey, Edward Harding	†M. E.	...	66	Damascus
*Bailey, Purdy Sanford	C. E.	210½	29½+5	Warren
*Baker, Charles Carroll	E. E.	219½	...	St. Paris
*Balz, Ernest	C. E.	209	98	Columbus
*Balz, Louis Christian Fred	C. E.	209	98	Columbus
Barker, Russel David	M. E.	223½	43½	Brooklyn, N. Y.
Barlow, Moses Henry	C. E.	209	159	Columbus
*Barringer, John Martin	Chem.	202	136	Washingt'n, D.C.
Barringer, Lawrence Eugene	Cer.	211	170+5	Washingt'n, D.C.
*Barry, William John	C. E.	209	78	New Straitsville
*Battenfield, John Milton	E. E.	218	68½	Delaware
*Baughman, Norman	E. E.	219½	42	Roseville
Baumann, John Carl Bernhardt	†Min'g, S.	...	59+21	Gütersloh, Germ.
*Bauroth, Walter John	M. E.	222	83	Springfield
Beard, Frank Andrew	I. A.	222	38	Jacksontown
*Bedwell, Charles Francis	E. E.	218	46	Columbus
Benbow, James D	I. A., S.	96	47	Milo
Berndroth, Geary Martin	M. E.	223½	45	Geneva
*Berry, Charles Watson	E. E.	219½	19	Columbus
Besse, Thomas Samuel	E. E.	219½	...	Pataskala
*Bigelow, Clarence C	E. M.	208	103½	Findlay
Billingsley, Robert Wallace	M. E.	222	99	Lisbon
*Bleininger, Albert Victor	†Chem.	...	126+31	Columbus
Boehme, Adolph Joe	M. E.	222	157+3	Youngstown
Bomesberger, Walter Nelson	E. E.	219½	45½+5	Columbiana
Boothman, Dale Maxwell	M. E.	223½	55½	Bryan
*Bostwick, Oliver Newton	C. E.	209	93	Mt. Sterling
Bott, George Robert	M. E.	222	156	Columbus
Bowden, Harry William, C. E.				Minerva
*Boynton, Henry Percy	E. M.	209½	14½+1	Elyria
Bradshaw, Eugene Bingham	Special	...	...	East Liverpool
*Bramble, Bennett Glenn	Chem.	209½	...	Bellefontaine
Brannan, Thomas Hayes	C. E.	210½	42+3	Marysville
*Brashear, Edward Rosemond	C. E.	210½	54½	Columbus
*Bridinger, Leon A	E. M.	209½	22½	Tiffin
*Britton, William Miller	E. E.	219½	28+13	Columbus
Britton, Lloyd C	C. E.	209	88	Williamsburg
Brooks, Herbert Barton	E. E.	218	111+6	Piqua
Buchenberg, Alvin Ernest, M. E. in E. E.	.....	...	...	Holgate

† Pursuing a special course.
* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Burch, Orrin	E. E.	218	63½	Columbus
Buydden, Wade Jennings, Jr.	E. M.	209½	7	Dayton
*Cameron, James L.	Arch.	217½	47½+2	Malvern
Cameron, Harry Ezra	C. E.	209	159	Lisbon
Cameron, Gaylor Malcomb	E. E.	219½	41	Jeromeville
Campbell, Willis Elmer	Chem.	208	92	Fostoria
Campbell, Rolo Wilbur	C. E.	209	53	Fostoria
Cannan, William	†Cer.	...	75	Plymouth
*Carmichael, Robert	M. E.	223½	29	Columbus
*Carr, William Brewster	E. E.	219½	...	Yellow Springs
Cartzdafner, Roy Edwin	M. E.	223½	53	London
*Caskey, George Alexander	M. E.	222	96	Columbus
Cavanaugh, Andrew Francis	M. E.	...	...	Dayton
*Cavin, Frank Thomas	E. E.	218	116	Spencer
*Chaffin, Wendel Wilson	C. E.	209	57+12	Dayton
*Chamberlain, John Ross	C. E.	209	56	Tiffin
Chandler, Homer Payne	E. E.	218	95+13	Columbus
*Chandler, William H.	C. E.	210½	...	Bellefontaine
Chenoweth, Howard	†E. E.	...	56	Range
Childs, Harry Jesse	C. E.	210½	21½+6	Troy
Chubb, Joseph Horace	C. E.	210½	47	Columbus
Clarke, James Ulrick	E. E.	218	111	Lancaster
Colgan, Frank J.	Cer., S.	90	30+52	Columbus
Conrad, Vern Louis	C. E.	209	104+6	Columbus
*Cook, Spencer Nye	E. M.	208	50½	Chillicothe
*Cooke, Royal Alstan	E. E.	219	132+10	Wyoming
Cooley, James Riddile	E. E.	219½	50½	Nelsonville
Cooper, Ralph McClelland	I. A., S.	96	15	Struthers
*Copland, James Samuel, Jr.	†M. E.	...	7	Dresden
Cosley, Harvey Harter	C. E.	209	154	Troy
Crabill, Pearl P.	†M. E.	...	86	Springfield
Crable, Arthur	C. E.	209	180+5	Columbus
Crable, George	E. M.	208	107	Columbus
Creed, Frank Roy	Mining, S.	91	27	Struthers
Cridland, Harry Clifford	E. E.	219½	55½	Dayton
Crooks, Thomas Elliott	E. E.	219½	55½	Van Wert
Cryder, Howard Michael	Arch.	215	69	Chillicothe
Cryder, Ross Warner	E. E.	219½	35½	London
Damon, Owen H., C. E.	.....	...	...	Hinckley
*Dann, Walter M.	E. E.	218	112	Columbus
Darrah, John Francy	E. E.	219	31½+2	Toronto
Davison, Holmes Bergen	Cer., S.	90	...	South River, N.J.
*Day, Stanley Frank	E. E.	219½	9½	Columbus
*Denmead, Edward Graham	M. E.	223½	32+3	Columbus
*Denny, Charles Wampler	E. E.	219	136	Middletown
DeWolf, Roger Dennison	E. E.	219	164+2	Madison, Ga.
Dick, Owen Quinton	I. A., S.	96	33+4	Marshall
Dickenson, Morris L.	†I A.	...	...	Columbus
*Diehl, Joseph A.	C. E.	209	81+8	Defiance
*Dierdorff, Percy Cyrus	M. E.	222	70	Columbus
Dill, Raymond	E. E.	219	162+3	Columbus

† Pursuing a special course.
* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
*Doty, Charles Wilgerson	E. M.	209½	11+5	Hanging Rock
Drummond, William George, M. E.	.....	...	...	Cleveland
Dunlop, Robert Rowse, M. E. in E. E.	.....	...	...	Columbus
*Dupuy, Benjamin Francis	C. E.	210½	52½+8	Ironton
*Ecker, Harrison Grant	E. E.	218	53½	Columbus
*Edgerly, Raymond John	C. E.	210½	39½+6	Pataskala
*Elliott, Emmett Foster	Arch.	215	103	Chester Hill
Elsner, Richard E	C. E.	209	61+4	Newark
Emswiler, John Edwin	E. E.	219½	54½	Morgan Center
Erdmann, William	I. A.	201	191+10	Chillicothe
Escobar, Raphael	†Min'g, S.	...	22	Puerto Principe,
*Espy, Frank	†E. E.	...	104	Kenton [Cuba
Euchenhofer, Albert John	E. E.	219½	39	Dayton
Evans, Charles Hopkins	Mining, S.	91	45	Evanston
*Evans, William Ruthrauff	M. E.	223½	...	Salem, Va.
*Eysenbach, Louis, Jr	Ceramics	214½	51½	Delphos
*Faulkner, Eldridge Rhodes	E. M.	209½	9½	Tippecanoe City
Faulkner, Samuel Starrett	E. E.	219½	...	Troy
*Fay, Sherman	M. E.	223½	55½	Wyoming
Fickes, Walter M., E. M in Ceramics	.....	...	...	Steubenville
Fleming, Joseph Hamilton	C. E.	209	99+24	Olentangy
Follett, George Alfred	C. E.	209	83+17	Columbus
Foster, George C	E. M.	208	107+2	Schooley
Foster, Vause	E. M.	209½	51½	Higby
*Fox, Lewis	C. E.	210½	26½+6	Payne
Frame, Rollo St. Clair	C. E.	209	159	Washington
Frankenberg, George T	M. E.	222	109	Columbus
Frechtling, Arthur George	M. E.	222	166+4	Hamilton
Freer, Will Davis	Cer.	211	49+4	Cortland
*Friedland, Francis William	M. E.	222	64½	Coalton
Frost, George Winfield, M. E.	.....	...	...	Columbus
Fulton, James Stewart	M. E.	223½	55½	Steubenville
*Funk, Leo William	M. E.	223½	41½+5	Chester Hill
Gates, Ellis Day	Cer., S.	90	45+25	Hinsdale, Ill.
Geren, Arthur G	Mining, S.	91	33+10	Columbus
Gilchrist, Edward Luce	E. E.	218	76	Ashtabula
*Gleichauf, Frank S	Arch.	215	103	Newark
*Goodell, Frank Herbert	Chem.	211	93	Columbus
*Gould, William Stewart	M. E.	223½	50½	Wyoming
*Gray, Thomas M	M. E.	223½	30	Pittsburg, Pa.
Green, Homer Stewart	E. E.	218	122	Raymond
Grindel, Charles Stanton	E. E.	219½	39½	Jacksontown
Hager, LeRoy William	C. E.	209	132	Piqua
*Hall, Robert Gilbert	E. M.	209½	21	Dayton
Halsema, Eusebius J	C. E.	210½	52+4	New Bremen
Halverstadt, Herbert	Cer.	214½	34½	Columbiana
Hamilton, Ross Elroy	C. E.	210½	52	Keene
Hammond, John Miller	C. E.	209	104+2	Columbus
Hance, Harry Thomas	Chem.	202	156	Columbus
Hapgood, Eugene Palmer	Chem.	202	118	Sabina
Hardy, Paul	E. M.	208	87½+5	Columbus

† Pursuing a special course.
* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Harkins, Robert Rusk, M. E.	.....	...	...	Columbus
Harmar, Frederick Sturgis	Mining, S.	91	20	Columbus
Harrop, Carl B	E. M.	208	107	Columbus
Harvey, Clarke Kenerly	C. E.	210½	53+3	Brownsville
*Hatton, Frederic George	Arch.	217½	11	Columbus
Hayman, Will Clayton, M. E. in E. E.	.....	...	...	Holgate
Hayes, Charles Bradford	E. E.	219½	55½	Hilliards
Hedges, Benson Rice	M. E.	222	107	Columbus
Helvey, George Stanley	M. E.	223½	53	Hamilton
*Herrick, Hobert C	Chem.	209½	19	Wellington
*Hershey, Herbert Clover	I. A.	222	4	Columbus
Hill, Harry Earl	C. E.	210½	100	Richwood
Hill, Cortland Latimer	C. E.	209	47	Berlin Heights
Hirst, Harry	E. M.	208	93	Midvale
Hitch, James Frank	C. E.	209	104	Batavia
Holbrook, George Frederic	E. M.	208	97	Bucyrus
*Holloway, Thurman Welferd	E. E.	219½	42½	Zanesville
Horn, Charles Curtis	E. E.	219½	...	Pipesville
Hoster, Herman A	M. E.	222	43½+6	Columbus
*Howard, Oscar David	Arch.	212	100+40	Circleville
*Huddleson, Frank	†E. M.	...	129	Columbus
Hulbert, William Rowsell	M. E.	222	79½+3	New York, N.Y.
Hull, Walter Austin	Cer.	211	107+8	Orangeville
Hummel, Edmund Ray	E. E.	219½	2	Carroll
*Hunter, James Williamson	C. E.	210½	54½+5	Zanesville
Hunter, Madone Carrington, M. E. in E. E	.....	...	...	Norwich
*Hylton, Gratwoods Walter	†M. E.	...	60	Springfield
Jackson, Charles Edwin	Cer. S.	90	45+3	Wheeling, W.Va.
Jackson, Elmer Collins	C. E.	210½	4½	Columbus
*James, Frank Richard	E. M.	208	82	Columbus
Johnson, Earl S., M. E. in E. E.	.....	...	...	Plants
Johnson, Walter A	M. E.	222	109	Columbus
*Johnston, Edward G	M. E.	223½	23+3	Bangor, Mich.
Jones, Howard Martin	E. E.	218	113	Marysville
*Jones, James Albert	C. E.	210½	38	New Straitsville
Judson, Walter Raymond	E. E.	219½	55½	Dayton
Kanmacher, Samuel Houston, M. E. in E. E	.....	...	...	Columbus
*Keating, Harvey Thomas	Chem.	208	100	Columbus
Keim, Herbert Edward	C. E.	210½	37½+2	Cleveland
Keller, Daniel Casteel	E. E.	218	54	Washington C. H.
Keller, William	E. E.	219½	20½	Washington C. H.
Kennedy, William McCreery	Cer. S.	90	10	New Brighton,
Kern, William Frederick	Chem.	208	107	Bellaire [Pa.
Kettering, Charles Franklin	E. E.	218	54	Loudonville
Kettler, Frank Christian	E. E.	209	155	New Bremen
*Kidder, Leonard	C. E.	210½	...	Woodstock
*Killinger, Claud H	C. E.	210½	7	Toledo
*Kimmel, Fred Bernham	E. E.	219½	46½+3	Van Wert
King, Francis Emmet	Mining, S.	91	89+10	Leisenring, Pa.

† Pursuing a special course.
* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
King, Herbert Sumner	C. E.	209	181+9	Medina
*Kinnear, Harry Baldwin	Chem.	208	88	Mt. Sterling
*Kinnison, Ernest Eugene	C. E.	209	99	Jackson
Kirker, Gaylord B	Mining, S.	91	88+19	Catlettsburg, Ky.
Kittle, James Monroe	M. E.	223½	66½	Columbus
Klie, Walter	M. E.	223½	48	Columbus
Knieling, Charles August	E. E.	218	103+2	Willoughby
*Knies, Daniel	E. E.	218	71½	Columbus
Knight, William Abner, M. E.	.....	...	...	Columbus
*Knoderer, Homer Guy	E. E.	218	112	Columbus
Knox, Frank S., E. M.	.....	...	...	Columbus
Krumm, Thomas Zettler	C. E.	209	83	Columbus
Kunkle, Fred Raymond	E. E.	218	79+14	Bryan
*Laiblin, Garfield	M. E.	222	80	Canton
Lamb, Whitney Earl, M. E. in E. E.	.....	...	...	Commercial Point
*Lampert, John Martin	M. E.	222	96	Xenia
*Lanning, Adrian Roy	C. E.	209	17	Dennison
Lee, Corlis Edgar, M. E. in E. E.	.....	...	...	Pugh Postoffice
*Leinbaugh, George Gurden	M. E.	220	160+3	Bellevue
*Lesh, John Howard	M. E.	220	146	Louisville
*Lied, Ernst Mitchell	E. E.	218	72	Columbus
Linville, Clarence Philander, B. Sc. in Chemistry	.....	...	...	Urbana
Linxweiler, Otto	M. E.	223½	43½	Dayton
Lloyd, Donald K.	Mining, S.	91	5	Columbus
Lockwood, Howard Thomas	C. E.	209	92	Batavia
Loewensohn, David	C. E.	210½	42½	Urbana
Long, George Garfield	E. M.	209½	54½	Tippecanoe City
*Luse, Herbert James	M. E.	223½	12	Columbus
Lyon, Arthur Hollingshead, M. E.	.....	...	...	Wauseon
*Marckworth, Otto Stanley	†Chem.	...	168	Cincinnati
Marietta, Harry Riefsnider	E. E.	218	100+3	Dayton
Marriott, John Minges	Arch.	215	82½	Delaware
*Marshall, Charles Howard	M. E.	223½	41	Fair Haven
Marshall, Willard Beverly, M. E. in E. E	.....	...	...	Piqua
Martin, John D., Jr.	M. E.	222	174+19	New Straitsville
Marting, Samuel Arthur	†Chem.	...	7	Portsmouth
Mason, John T.	†Chem.	...	25	Columbus
Maxwell, Howard McGee	E. E.	219½	10½	Columbus
*Melick, Cyrus Alan	C. E.	210½	54½	Columbus
Melick, Neil Albert, C. E.	.....	...	...	Columbus
Mercer, Robert Wood	E. M.	209½	51½	Chester Hill
*Miller, Albert Sanford	E. M.	209½	20½	Tiffin
Miller, Charles Emmitt	Arch.	212	150+5	Spencer
*Miller, Ralph Charles	C. E.	209	138+11	Zanesville
*Minor, Wells Hammond	E. M.	209½	54½	Akron
Moist, Harvey Clinton	E. E.	219½	...	Kinsey
Monserrat, Charles R.	M. E.	223½	31	Columbus
Mooney, George Lewis	E. E.	219½	55½	Woodsfield
*Mooney, William Joseph	C. E.	210½	11½+3	Cleveland

† Pursuing a special course.
* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
*Morlan, Wilbert	†M. E.	...	91+7	Rogers
Morris, Robert Hamilton	E. M.	209½	135+20	Columbus
Morris, Samuel	E. E.	219½	12½	Bloomingburg
Morris, Willard Bernard	M. E.	222	91	Columbus
*Morris, William Blaine	M. E.	222	109	Massillon
Morrison, Franklin Houston	Cer. S.	90	45+10	Denver, Col.
*Murphy, Joseph Lincoln	C. E.	210½	49½	McArthur
Myers, Albert B., E. M.	.....	...	...	Columbus
Myers, Fred	C. E.	210½	44½	Louisville
McComb, Hoyts Sherman	E. E.	219½	41	Columbus
*McEowen, Hugh Elsworth	C. E.	210½	17+9	Greenville
*McFarland, Horace M.	E. M.	208	97	Columbus
McIntosh, Roscoe Everitt	E. E.	219	158+5	Ravenna
McKeon, Robert Dale	C. E.	209	99	Arcanum
*McKinlay, William Shields	E. E.	218	7	Denver, Col.
*McMullin, Roy	E. E.	219½	24	Columbus
*McOwen, Thomas	C. E.	210½	47+34	Ovid
*McWhinney, Harry Ozias	E. E.	219½	18½+15	Lewisburg
*Nauss, Ralph Welty	Chem.	202	153	Greenville
Needham, Harry Smithson, M. E.	.....	...	...	Columbus
Nicholson, Charles Marion, M. E. in E. E	.....	...	...	Columbus
*Nidy, Herbert C.	E. E.	219	162+2	Greentown
Nobles, Edwin Earl	†C. E.	...	24	Flint, Mich.
Nold, John H., E. M.	.....	...	...	Columbiana
*Nye, Ralph D.	E. E.	219½	52	Zanesville
Ogden, Ellsworth	M. E.	223½	64½	Columbus
*Ohliger, Clyde C.	C. E.	210½	14	Wellsville
Osborn, Liphe Andrews	M. E.	223½	47	Columbus
O'Shaughnessy, Joseph	I. A., S.	...	96	Columbus
*Panter, Thomas Alfred	E. E.	218	104	Niagara Falls,
*Parkin, William Z.	M. E.	222	77	Columbus [N. Y.
Parrett, Benjamin Creamer	Chem.	208	91	Washington C. H.
Patton, William Arthur	M. E.	223½	9½	Circleville
Peck, Alfred Steven	Mining, S.	91	53	Cleveland
*Perks, George Wheldon	M. E.	222	85	Springfield
Peterson, John William	Arch.	217½	54½	Port Clinton
Pleukharp, Erwin Hiram	I. A., S.	91	42	Columbus
Pope, Mrs. Edna L.	Special	...	2	Columbus
*Post, Malcolm Phelps	Cer.	211	83+10	St. Louis, Mo.
Poto, Frank B.	Chem.	202	167	Alliance
Potts, Royal Warren	†C. E.	...	29	Columbus
Pratt, Fred Kellogg, C. E.	.....	...	...	New Philadelphia
Price, Fred Raymond	E. E.	219½	34½	Columbus
Reed, Nathaniel Garfield	M. E.	223½	55½	Youngstown
Reel, Walter C.	C. E.	210½	9½+3	Columbus
Rennard, John Hiram	Mining, S.	91	44+1	Wheeling, W. Va.
*Riebel, Leroy Clemens	Arch.	217½	37½	Columbus
Rightmire, Robert Elwood	M. E.	222	120+6	Wheelersburg
Ritchie, George Alexander	C. E.	210½	38½	Hudson
Robinson, Robert Thane	E. E.	219½	17½	Bryan

† Pursuing a special course.
* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Rogers, Rutherford Hayes	E. E.	218	46+5	Columbus
*Romick, Howard Samuel	M. E.	223½	...	Hilliards
*Ross, Calvin Burt	E. E.	219½	55½	Urbana
‡*Ross, Edward McKinstry	M. E.	223½	24½	Jerseyville, Ill
*Roth, George Lewis	E. E.	219½	16	Port Clinton
*Roudebush, Howard John	E. E.	219½	26	Owensville
*Rupert, Jesse Solomon	E. E.	219½	7	New Waterford
*Ryland, Paul Dillen	C. E.	209	189+2	Columbus
Sanderson, Clarence Herbert	E. E.	218	94	Logan
*Sanderson, Ray Rochester	E. M.	208	70+6	Washington C. H.
Sayers, Delbert Bancroft	E. M.	208	105+9	Marits
*Schlafly, Raydeon Karl	C. E.	210½	69½	Mt. Eaton
Schoenlaub, Thomas Jacob	C. E.	209	77	Marion
*Schott, Alvin Christian	Chem.	208	56	Massillon
Schreiber, George Ernest, M. E. in E.E.	.....	...	...	Ironton
Schubert, Charles Wesley	C. E.	210½	54½	Columbus
Schwab, Frank Wilbert	Chem.	208	94	New Philadelpiha
*Scott, Cyrus Ellison	E. M.	209½	39½+9	Columbus
Scott, James Blaine	E. E.	219½	10½	Batavia
Senter, Herbert Pike	C. E.	209	104	Columbus
Sessions, Elizabeth	Special	...	...	Columbus
Sharp, John McDowell	C. E.	210½	36½+2	Columbus
*Shaw, Lucian	C. E.	209	72+3	West Lafayette
Shepherd, Charles William, C. E.	.....	...	...	Huron
Sherman, John K.	C. E.	209	154	Columbus
*Sherwood, Frank Porter	†E. E.	...	128	Ashtabula
Shumate, Frank Douglass	M. E.	222	94+2	Urbana
Siddall, John William	Mining, S.	91	45	Streator, Ill.
*Sigrist, Charles Ferdinand	C. E.	210½	42½+10	Congress
*Simpson, Henry Jerome	C. E.	209	58+3	Worthington
*Singer, Lewis Parmlee	E. E.	219½	16½	Lewisburg
*Sinks, George Theodore	M. E.	223½	20	Youngstown
Smith, Harry Ford	M. E.	222	109	Lexington
Smith, Roy Brooke	M. E.	223½	56½+2	Columbus
Sosman, Robert Browning	Chem.	209½	56½	Chillicothe
Sowers, Emory Blose	I. A.	222	52	Westville
Spangler, Thomas McClellan	†C. E.	...	23	Pleasantville
Sproat, Amasa Delano	E. M.	208	107+8	Chillicothe
Stanton, Frederic Moses	Chem.	209½	21+15	Ridgeville
Starbuck, John Clancy	I. A., S.	96	16	Somerton
*Sterling, James Gilman	M. E.	222	101	Springfield
*Stocker, James Arthur	C. E.	209	104	Gnadenhutten
Stone, Thomas Wade	M. E.	222	100½	New Bremen
Stout, Wilber	Cer., S.	90	40+15	Sciotoville
Strong, Harry Miller	†Min'g, S.	...	39	Wilkesville
Strong, Jonathan Edgar	M. E.	223½	16½	Columbus
*Stull, Raymond Thomas	Cer.	211	101	Elkland, Pa.
*Talbot, Edgar Carl	E. E.	219½	...	Columbus
*Tanner, Edward Wood	M. E.	222	104	Zanesville
Taylor, William Oliver	E. E.	219½	55½	Urbana

† Pursuing a special course.
* Preparatory work incomplete.
‡ Died August 13, 1900.

	Course	Course Hours	Credit Hours	Home Address
*Templin, John Richard	E. E.	219½	42½	Salem
Thomas, Alfred Redman	Mining, S.	91	87	Glouster
*Thomas, Edward	Chem.	209½	37½	Navarre
*Thornton, Nyman	M. E.	223½	47½	Wyoming
Trish, George	Mining, S.	91	88	Nevada
Tubbs, Alfred Stowe	Mining, S.	91	38	Tubbsville
*Tudor, Glenn E	C. E.	210½	42½+3	Chicago
Tyler, John Sherrerd	M. E.	223½	42+12	Dayton
Van Dyke, Clifford Steel	E. E.	219	160	Ansonia
*Van Schoyck, Ray	M. E.	223½	...	Hilliards
*Van Tine, Charles Hovey	M. E.	223½	62	Tiffin
Vosskuehler, Joseph Henry	M. E.	...	...	Dayton
*Waddell, Starling	E. E.	218	55	Columbus
*Walker, Walter Hamilton	E. E.	219½	2	West Canaan
*Walsh, George E	M. E.	223½	13	Columbus
*Ward, Samuel Edwin	M. E.	223½	56	Green Spring
*Ward, Vernon C., Jr	M. E.	222	72	Columbus
*Warnock, David Ross	E. E.	219½	4½	Urbana
*Webber, Frank Merrill	E. E.	219½	32	West Richfield
Weber, Frederick Clarence	Chem.	202	138	Evanston
*Weidman, Charles Albert	E. E.	219½	21	Navarre
*Weiss, William Winfred	C. E.	210½	33½	Canal Dover
Wellbaum, Arvy E	M. E.	222	109	Brookville
*Wells, Ralph P	M. E.	223½	14½	Lisbon
*Whetsel, Emerson Jay	C. E.	209	82+5	Jackson
*White, Frederick Lewis	M. E.	223½	...	Gambier
Wiel, Arthur Bernard	Special	...	17	Cleveland
Wilcox, Carl Clifford	M. E.	223½	47	Columbus
*Wildermuth, Troy Dreslan	M. E.	223½	2	Columbus
Williams, Harry Ernest	M. E.	222	109	Harlem
*Williams, Howard Insco	C. E.	209	39+4	Dayton
Williamson, Homer Davison	Chem.	202	179	Monroe
*Wilson, James Sommerville	M. E.	222	162+22	Columbus
Winger, Stanley DuBoise	M. E.	222	92½	Springfield
Wittich, Manuel	Cer., S.	90	20+5	Mt. Sterling
Wolf, Richard Ludwig	Cer., S.	90	45+17	Detroit, Mich.
Wright, John	Cer., S.	90	20	Antrim, Pa.
Wright, Lawrence Robert	E. E.	219½	30½+18	Gambier.
Wright, Otis H	E. E.	219½	47½	Worthington
*Wyer, Samuel S	M. E.	223½	48½	Barberton
Yost, Benjamin Franklin	†Min'g, S.	...	...	Columbus
Yost, Lloyd	M. E.	222	103	Somerset
Youmans, W. Raymond	E. E.	219½	53½	Pataskala
Zbinden, Hermann Christian	C. E.	210½	130+6	Toledo
*Zeller, Ralph	E. M.	209½	66½	Ottawa
Zwerner, Fred George	E. E.	219½	54+6	Columbus

† Pursuing a special course.
* Preparatory work incomplete.

COLLEGE OF LAW

UNDERGRADUATES — 201

	Year	Home Address
Addison, Arthur Everet	Third	Columbus
Addison, Clarence Maywood	Third	Columbus
Alvord, Justus Elvin	Second	Bryan
Amos, Frank Craig	Second	Sidney
Anderson, Ralph	First	Dennison
Armstrong, Russel Livingston	Third	Celina
Arnold, Harry Crumley	Second	Columbus
Ashman, Frank	Second	Coshocton
Baggott, Roland Webb	Third	Dayton
Bamer, Merton Leonard	Second	Grand Rapids
Barnet, Clarence Elwood	First	New Paris
Beatty, Robert Jay	Second	Cardington
Bechtol, John M	First	Fayette
Beetham, Rupert Rennison	Third	Cadiz
Benedict, Charles Yeddo	Third	Mansfield
Berry, Edmond Franklin	Second	Celina
Bininger, James Wolfgang	Third	Lancaster
Bock, Theodore E	Second	Hamilton
Bolton, Thomas Bennett	First	Cleveland
Bostwick, Homer Z	First	Columbus
Bowden, Harry W	Special	Minerva
Bowers, Walton S	Second	Hamilton
Branum, Frank C	First	Bridgeport
Bright, Frederick Ijams	Third	Logan
Brown, Albert Marion	First	Wauseon
Brown, James Earl	Second	De Graff
Burgess, James Henry	Second	Big Horn, Wy.
Burkey, Charles Paul	First	Pleasantville
Byers, William E	Third	Loudonville
Calderwood, Charles Barton	Second	Columbus
Calkins, Frank Elwood	Third	Grand Rapids
Calvin, Anthony B	Third	Youngstown
Carey, John T	Second	Upper Sandusky
Cary, Charles Ross	Third	Millersburg
Clark, Lawrence Hayes	First	Cumberland
Clark, William Whittier	First	Canton
Clum, Harry Ernest	Second	Thornville
Cockerill, Orville Porter	First	Washington C.H.
Courtright, Thurman Thomas	Third	Greencastle
Crawford, William Harry	Third	Massillon
Croll, Alfred Jacobs	Third	Tontogany
Crout, Ray Durand	First	Columbus
Cullen, William Barnes	First	Hamilton
Curran, Bernard Franklin	Second	Corning
Damon, Owen H	Special	Hinckley
Darby, Roscoe Bryant	Third	Wauseon
Dawson, Nathan Charles	Second	Columbus
Determan, Hugo Philip	First	Columbus
De Witt, Claude Bennett	Third	Sandusky

	Year	Home Address
Donley, Russell Lee	Third	West Bedford
Doud, Harry L.	Second	Norwalk
Downing, Earl Summerville	Second	Middleport
Du Bois, Aaron Smock	Third	Franklin
Duff, Alfred L.	Second	Port Clinton
Dunlap, Carl Reed	Second	Columbus
Eagleson, Joseph Pentecost	First	Columbus
Euans, William Weldon	First	Columbus
Evans, Thomas Daniel	First	Newark
Feibel, Louis	Second	Hillsboro
Fippin, Elmer Otterbein	First	Galloway
Frankenberg, Don Juan	Second	Tempe, Arizona
Foster, George Gruel	First	Columbus
Friedlich, Alfred	Third	Troy
Galloway, Arthur Clyde	Second	Columbus
Gardner, Howard Julius	First	Kent
Graven, D. Homer	Third	Nashville
Haberer, Harry Andrew	Second	Dayton
Hahn, Howard Edward	Third	Coshocton
Hammond, Frank Nathan	Second	Smithfield
Hammond, Frederic Mathas	Second	Smithfield
Hancock, Winfield Scott	Third	Marietta
Harper, Ellahue Ansile	Third	Columbus
Harris, Claudius Earl	First	Martinsville
Hershey, Harry Hartman	Third	East Greenville
Hertlein, John F.	Third	Sandusky
Hite, William A.	First	Thornville
Hornbeck, Ross Garfield	First	London
Houss, Eugene Augustus	First	Wapakoneta
Howells, George A.	Third	Massillon
Hummell, Edwin Ray	First	Carroll
Jacobs, Horace K.	Third	Waynesville
Jahn, Nan	Third	Columbus
Johnson, Charles Foster	First	New Albany
Jones, Abbe Linhart	Second	South Zanesville
Jones, David Thomas	First	Youngstown
Jones, Hanby Raymond	Second	Westerville
Jones, Victor Waite	First	Columbus
Judge, James	First	Columbus
Keating, David Thatcher	First	Columbus
Keith, Donald Roscoe	First	Spencerville
Kellison, Edward Lafayette	Third	Quincy
Kennard, Oron Ellsworth	First	Chester Hill
Kinzel, Harry Gilbert	Second	Eagleport
Kistler, Charles Edward	First	Carroll
Kistler, Jonathan Aaron	First	Carroll
Lane, Quinton R.	Third	Canal Winchester
Lash, Henry Lloyd	Second	Bolivar
Laybourne, Lawrence E.	First	Springfield
Layne, Andrew J.	Second	Ironton
Leonard, Ralph Sherman	First	Granville
Lloyd, Erastus Guy	Second	Westerville
Long, Albert Taylor	First	West Carrollton

	Year	Home Address
Loup, Thomas M.	Third	Steubenville
Lynch, John Woods	Second	Greenville
Mallow, Lewis Earl	Second	Washington C. H.
Marquis, Fred Samuel	Third	Mansfield
Mattison, George C.	Second	Wauseon
Meier, William Henry	Third	Mt. Carmel
Melick, Neal A.	Special	Columbus
Minshall, Thaddeus Ellis	Second	Chillicothe
Minshall, William Edwin	Third	Coshocton
Moore, Henry Curtis	Third	Bainbridge
Morgan, Lewis W.	Third	Gibsonburg
Morris, Ingle Alman	Third	Columbus
Murphy, Frank Hayes	Second	New Comerstown
McCleary, Clayton Asa	Third	Science Hill
McClure, Robert Edward	Third	Dayton
McCray, Thomas Yates	Third	Mansfield
McCulloch, Roscoe Conkling	First	Millersburg
McGarry, James F.	First	East Liverpool
Nesbitt, David M.	First	Bellaire
Nevin, Lurton K.	First	Dayton
Nicholas, Edward Mithoff	First	Columbus
Nicholas, William Renfrew	Second	Columbus
Nicola, Benjamin Di	Third	Barnhill
Norpell, Ralph	Second	Newark
Peck, Foreman Jacob	Third	Clarksburg
Pence, William D.	Second	Columbus
Plagman, Lester W.	First	Fremont
Polk, Winfred Whittington	Third	New Vienna
Poole, Loren Winfield	First	De Graff
Pratt, Fred Kellogg	Special	New Philadelphia
Price, Jonathan A.	Second	Chili
Ramsey, Russell Kenney	Second	Columbus
Ranney, Jesse Fred	First	Columbus
Reed, Bert	Second	Piqua
Rightmire, George Washington	Second	Wheelersburg
Roebuck, Carl Fletcher	First	Dalton
Royon, Joseph Charles	First	Houston
Ryland, Paul Dillen	Special	Columbus
Sackett, Carl Leroy	Second	Big Horn City,
Sampson, John Henry	First	Columbus [Wy.
Scarlett, Henry Launcelot	First	Columbus
Schantz, Edwin Michael	First	Zimmerman
Schoedinger, Frederick H.	First	Columbus
Schwenck, William Jennings	Third	Kenton
Shaw, John William	Second	Troy
Sheetenhelm, Curtis Cicero	First	Columbus
Sheetz, George W.	First	New Washington
Shepherd, Charles William	Special	Huron
Shepherd, George Harvey	Second	Dayton
Shoemaker, William Allen	First	Zanesville
Shotwell, Franklin Albert	First	Marengo
Sigrist, Charles Ferdinand	Special	Congress
Skiles, Roscoe Carleton	Second	Shelby

	Year	Home Address
Smith, Wellington Cornell	Second	Lytle
Snow, Mason J	First	Columbus
Southworth, Ferdinand Leek	Third	Alliance
Sparks, Homer H	First	Columbus
Sprague, William Ralph	Second	Columbus
Springer, Nevada Weston	First	Columbus
Spurrier, Emery Allen	First	Chester Hill
Steinemann, George Charles	First	Minster
Sterrett, Frank Marion	First	Troy
Stevenson, Amos Claude	Third	Fostoria
Stewart, Gabrielle Townshend	Third	Cleveland
Stoolfire, Henri Stanton	Third	Columbus
Strader, Maynard	First	Zuber
Tangemann, Theodore H	Second	Ketterville
Tanner, John Robert	Third	Mt. Sterling
Taylor, Everett Buren	First	New Albany
Taylor, Frank Stewart	First	Alliance
Terwilliger, Meeker	Second	Circleville
Thomas, Herbert Spencer	First	Wheeling, W.Va.
Tipton, Robert	First	Milo
Toland, Harford Aquilla	Third	Columbus
Turner, Edward C	Second	Columbus
Veneman, Nevin Edward	First	Dayton
Voegele, William Frederick, Jr	Third	Mansfield
Wakefield, George W	Second	Reynoldsburg
Walker, Mary Ray	First	Dayton
Warden, Hosea Gilford	Second	Columbus
Wertz, Edward Sleeser	Third	Dalton
West, Frederick Rollin	Second	Columbus
Westwater, James Gulick	First	Columbus
Wharton, Homer Franklin	Second	Washington
Wheeler, Newberry William, Jr	Second	Portland
Williams, John William	Second	Roseville
Williams, Lloyd Thomas	Third	Jackson
Williamson, Allen Thurman	Second	Grandview
Wilmot, Charles Austin	Third	Claridon
Wilson, Frank	Third	Jolly
Wilson, Lewis Ernest	First	Columbus
Wise, Charles Clifton	First	Millersburg
Wolf, Edward Christofer	First	Circleville
Woods, Charles Howard	Third	Chillicothe
Worcester, Wood Frank	First	Columbus
Worman, Horace Dye	Second	Dayton
Wulff, August R	Second	Dayton
Yockey, Paul B	Third	Columbus
Young, Samuel N	Third	Lima

COLLEGE OF PHARMACY

UNDERGRADUATES — 39

	Course	Course Hours	Credit Hours	Home Address
*Ashinger, William E.	Long	208½	...	Uphur
Barrick, Alfred Ashberry	Special	...	144	Columbus
Block, Arthur William	Short	112	49	Galion
Bodman, Edgar Sereno	Long	208½	49½	Bement, Ill.
*Bowen, Charles Flood	Long	206	171+24	Columbus
Briggs, Claude Nicholas	Short	112	...	Briggsdale
Canfield, Delos Wilford	Short	112	105+26	Chardon
Cassady, Clyde Brint	Short	112	69	Alliance
Crosson, Stanley Berry	Short	112	40	Blanchester
Day, Levi Wille	Short	112	...	Mt. Oreb
*Funk, Roy William	Long	206	137+12	Chesterhill
Gardner, Charles Alfred	Short	112	107	Danville
Haudenschild, Harry J.	Short	112	43+6	Loudonville
Harvey, Lucy Manola	Short	112	107+60	Pomeroy
Hollingsworth, Clyde Evans	Short	112	37	Mt. Gilead
Hoover, Walter Emmett	Short	112	67	Ashville
Horst, Herman Henry	Short	112	28	Marysville
Hurst, Grace	Short	112	...	Piketon
*Keller, Charles Franklin	Short	112	38	Arcanum
Kerr, Franklin Pierce, Jr.	Special	...	110+19	Columbus
Kimberly, Charles Hubbell, B. Sc.	.....	...	...	N. Fairfield
Knowlton, Fred A.	Short	112	57	Granville
Krebs, Otto	Short	112	48	Cleveland
Lefferson, Charles Henry	Short	112	36+10	Middleton
Morris, Harry Long	Special	...	161	Springfield
*Naddy, Charles Joseph	Long	206	114	Columbus
Oglesby, Nicholas Perkins	Short	112	102+6	Lucretia, Va.
Phillips, James McIlvaine	Special	...	3	Columbus
Pope, Harry Bentley	Short	112	53	E. Liverpool
Roush, Katherine Layzelle	Short	112	10	Syracuse
Sherman, James Garfield	Short	112	38+12	Columbus
Snyder, Roy Bernard	Short	112	43	London
Squire, Clarence W.	Short	112	73	Ashville
Stoelzel, Julius Frederick	Short	112	15	Loudonville
Tracy, John Baptist	Short	112	68	Circleville
Wagstaff, Harry Garfield	Special	...	112	Niles
Ware, George H.	Short	112	20	Dayton
Webb, Edward Nathan	Long	206	113	Rome
Young, Cyrus Homer	Long	206	118	Wooster

* Preparatory work incomplete.

COLLEGE OF VETERINARY MEDICINE

GRADUATE STUDENTS—5

	Home Address
Clawson, Clarence Alfred, B. Sc. (Agr.)	Okena
Hanawalt, David Christopher, V. S. (Ontario)	Greenfield
Hart, Arthur Clark, V. S. (Ontario)	West Richfield
Imes, Marion, B. Sc. (Agr.)	Bashan
Murray, Frank Erskine, D. V. M.	Greenfield

UNDERGRADUATES—17

		Course Hours	Credit Hours	Home Address
*Auer, Curtiss		172	18	Lewisville
Brown, Harry Wilbur		172	54	Columbus
Eddy, William D. V. M.		...	...	East Cleveland
*Forrester, Harry Arthur		172	54	Reynoldsburg
*Griffin, Frank		177	165	Columbus
Hammond, Harry James, D. V. M.		...	...	Sharon
*Henderson, Charles Logan		172	54	Crescent
*Irwin, Albert N.		177	112	Columbus
*Johnson, Theodore Charlemagne		177	106	Akron
*Lamb, Morgan Baxter		172	34	Barlow
*Metzger, Edward Louis		177	108	Louisville
Morrow, Charles James, D. V. M.		...	...	Tiro
*McClelland, Robert Lyle		172	66	Andover
*Pettiford, Oscar Collins		172	54	Wauseon
*Sater, Clinton Huron		172	54	Sater
*Severn, Warren		172	54	Cuba, N. Y.
Worcester, Warner	Special	...	186	Columbus

* Preparatory work incomplete.

GENERAL SUMMARY

COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE—		
Graduate Students	4	
Undergraduates	153	
		157
COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE—		
Graduate Students	25	
Undergraduates	419	
		444
COLLEGE OF ENGINEERING—		
Graduate Students	11	
Undergraduates	394	
		405
COLLEGE OF LAW—		201
COLLEGE OF PHARMACY—		39
COLLEGE OF VETERINARY MEDICINE—		
Graduate Students	5	
Undergraduates	17	
		22
Total		1,286
Names counted twice		16
Net total		1,252

SUMMARY BY COUNTIES

Adams	1	Guernsey	4	Morrow	6
Allen	5	Hamilton	13	Muskingum	18
Ashland	9	Hancock	3	Ottawa	3
Ashtabula	11	Hardin	3	Paulding	1
Athens	3	Harrison	5	Perry	13
Auglaize	10	Henry	5	Pickaway	14
Belmont	9	Highland	4	Pike	2
Brown	2	Hocking	3	Portage	8
Butler	14	Holmes	5	Preble	10
Carroll	3	Huron	9	Putnam	4
Champaign	14	Jackson	11	Richland	10
Clark	10	Jefferson	9	Ross	24
Clermont	12	Knox	17	Sandusky	4
Clinton	8	Lake	3	Scioto	6
Columbiana	16	Lawrence	6	Seneca	10
Coshocton	13	Licking	22	Shelby	3
Crawford	5	Logan	10	Stark	22
Cuyahoga	15	Lorain	8	Summit	9
Darke	6	Lucas	6	Trumbull	6
Defiance	1	Madison	17	Tuscarawas	12
Delaware	6	Mahoning	9	Union	12
Erie	16	Marion	6	Vinton	3
Fairfield	20	Medina	9	Van Wert	2
Fayette	14	Meigs	11	Warren	7
*Franklin	423	Mercer	2	Washington	5
Fulton	9	Miami	16	Wayne	11
Gallia	8	Monroe	2	Williams	5
Geauga	6	Montgomery	39	Wood	7
Greene	9	Morgan	11	Wyandot	2

SUMMARY BY STATES AND COUNTRIES

(As far as known)

Alamaba	1	Iowa	1	Ontario	1
Colorado	2	Kentucky	2	Oregon	1
Cuba	1	Michigan	5	Pennsylvania	6
Georgia	1	Missouri	1	Virginia	3
Germany	1	New Jersey	1	Washington, D. C.	2
Illinois	9	New York	6	West Virginia	7
Indiana	2	Ohio	1197	Wyoming	2

*Nearly forty-two per cent. of the students registered from Franklin county are those whose homes are at Columbus only during their University course.

GRADUATES

GRADUATES

The faculty of the Ohio State University are anxious to place a copy of each annual catalogue in the hands of every graduate. They will esteem it a favor of any alumnus who changes his residence will notify the Executive office of his new address and occupation. They will also be grateful for any information from any source, that may assist in making or keeping the Directory of the Alumni complete and correct.

ALUMNI ASSOCIATION

OFFICERS FOR 1900–1901

MRS. ANNIE W. SIEBERT, '84, Columbus.....*President*
FRANK RAY, '87, Columbus.....*Vice-President*
LOWRY, F. SATER, '95, Columbus.....*Secretary*
MIRON A. SMITH, '92, Columbus.....*Treasurer*
G. GLEN ATKINS, '88, Greenfield, Mass.....*Orator*

COMMITTEE ON COLLEGE AFFAIRS

FLORIZEL SMITH, '80, Columbus.....Term expires 1901
MRS. HARRY I. ABBOTT, '93, Columbus..... " 1902
LORING HAPGOOD GODDARD, '92, Manora, Ohio..... " 1903
KARL T. WEBER, '97, Columbus..... " 1904
BERTHOLD A. EISENLOHR, '98, Corning..... " 1905

COMMITTEE ON NECROLOGY

LOWRY F. SATER, '95, Columbus.....Term expires 1901
DAISY M. SCOTT, '87, Columbus..... " 1902
EDWARD J. CONVERSE, '86, Columbus..... " 1903

DIRECTORY

A

Abbott, Arthur Grant, 1899, B. Sc. (Agr.), Medina.
Abbott, Royal A., 1900, B. Ph., Columbus.
Ackerman, Eli Osborn, 1884, C. E., 2664 North High street, Columbus, Columbus Street Railway Co.
Ackerman, Fremont, 1883, C. E., Los Angeles, Cal., civil engineer.
Addison, Arthur Everett, 1895, B. Ph., 1900, LL. B., Columbus, teacher East High School.
Addison, Louis Granville, 1892, LL. B., Columbus, attorney–at–law.
Addison, Clarence Maywood, 1896, B. Ph., 1900, LL. B., Columbus, teacher Central High School.
Agler, Eulalia, 1895, G. Ph., Columbus, with Columbus Pharmacal Company.
Albert, Louisa Mary, 1895, B. A. (Ohio Wesleyan University), 1896, G. Ph., Mrs. A. E. Vinson, Columbus.
Aldrich, Chester H., 1888, B. A., LL. B., David City, Neb., attorney–at–law.
Aldrich, Edgar S., 1897, M. E. in EE., Proprietor and Manager Electric Light Plant, Waynetown, Ohio.
Alexander, St. Clair, 1893, M. E. in EE., Bridgeport.
Alexander, Charles P., 1896, M. E. in EE., Canton, O., District Manager Northwestern Mutual Life Insurance Company.
Allaman, William Ernest, 1896, G. Ph., Columbus, Student O. M. U.
Allen, Edward Harrison, B. A. (Ohio Wesleyan University), 1899, LL. B., Lena.
Allen, Lucy, 1897, B. A., 1900, M. A., Columbus, library assistant, State University.
Alsdorf, Percy Reed, E. M., Central City, Col., Standard Assay office.
Alsdorf, Frederick Charles, 1892, E. M., Central City., Col., Superintendent Mt. Wilson Gold and Silver Mining Co.
Alspach, Rufus Edwin, 1897, M. A. (B. A. Heidelberg), Thornville.
Anderson, James T., 1884, B. A., Colorado Springs, Col., 1st Lieutenant U. S. Army.
Anderson, Newton M., 1879, B. Sc., Cleveland, Principal of the University School.
Andress, Edna A., 1900, B. Ph. (Mrs. Julius Stone) Columbus.
Andrews, Albion Joseph, Jr., 1893, LL. B. (B. S., Ohio Wesleyan University), Zanesville.
Andrews, Lincoln Elmer, 1893, LL. B., 1895, B. Ph., Columbus, attorney–at–law.
Armstrong, Edna, 1897, B. Ph., Columbus.
Armstrong, William H., 1890, G. Ph., Marysville, druggist.
Arnold, Charles Lincoln, 1890, B. Sc., 1894, M. Sc., West Eighth ave., Columbus, assistant professor in mathematics, State University.
Arnold, Edwin E., 1898, M. E., Westinghouse Machine Co., Pittsburg, Pa.
Atkins, G. Glenn, 1898, B. A., Greenfield, Mass., pastor Congregational Church
Atkinson, Warren, 1899, M. E., Tester of steam pumping engines at works of H. R. Worthington, Brooklyn, N. Y.
Auld, James A., 1897, M. E. in EE., Columbus, with D. S. Auld, 76 East Gay street.
Austin, John Gustave, 1899, LL. B., Sparta.

B

Bachtell, Nellie May, 1895, B. A., New London, teacher.
Backhaus, Henry Ward, 1894, B. A., Wapakoneta, cashier People's National Bank.
Baer, Philip, Jr., 1897, B. Sc. (Agr.), Canal Dover, Dairy Farmer.
Bagley, Anna Gertrude, 1894, G. Ph., Columbus, with Hallwood Cash Register Company.
Baker, James Burt, 1898, LL. B., Salem.
Baker, John Ezra, 1897, B. A., 1898, LL. B., St. Paris.
Baker, William Hollister, 1892, B. Agr., Hazelhurst, Mo., farmer and stock raiser.
Baldwin, Elizabeth Grant, 1899, B. Ph., Columbus.
Baldwin, Zoa Belle, 1896, B. A., Neil Av. Columbus.
Ball, Emma Leanna, 1895, B. Sc., 1896, M. Sc., Columbus.
Ball, Fred S., 1888, B. Ph., Montgomery, Ala., attorney-at-law.
Bancroft, Gay, 1898, B. A., Columbus, 26 West Gay street.
Barcus, Eliza D., 1900, B. A., Columbus.
Barcus, Miner, 1897, M. E., in EE., Schenectady, N. Y., with General Electric Company.
Barlow, Helen M., 1898, B. Ph., Columbus.
Barnaby, Charles L., 1898, C. E., 37 South Ninth street, assistant on Engineer Corps, Cincinnati Division, P. C. C. & St. L. Ry.
Barnaby, Josephine, 1896, B. Ph., Warren, teacher.
Barrows, Harry Holbrooke, 1898, C. E., Lexington, Ky., resident engineer Cincinnati Southwestern R'y.
*Bartholomew, Clyde Stanley, 1896, C. E., died June 23rd, 1900.
Basterdes, Ada Mabel, 1890, B. Ph., Plano, Ill., teacher in High School.
*Bates, Josephine M., 1881, B. Ph., Mrs. Florizel Smith, died ——, 1900.
Bates, Wesley, C., 1882, LL. B., 35½ N. High street, Columbus, Attorney.
Baughman, George W., 1897, G. Ph., Springfield, Pharmacist.
Beach, David Price, 1895, C. E., Wellsville, in employ of Pennsylvania Railroad.
Beach, Margaret Alice, 1891, B. Ph., Mrs. Wilson Holman, Bayonne, N. J.
Beardsley, Orsamus D., 1898, B. Ph., Garrettsville.
Beattie, William Renick, 1894, B. Sc., 1897, M. Sc. (in Horticulture), Washington, D. C., U. S. Department of Agriculture.
Beck, Arthur Andrew, 1893, C. E., Columbus, county surveyor's office.
Belden, Sanford Bonner, 1895, E. M., Manager Pittsburg Office Jeffrey Manufacturing Company.
Bell, Florence Louise, 1900, B. Ph., Columbus, 382 East Town street.
Bell, Mary Edith, 1894, B. Ph., teacher in Central High School, Columbus.
Bennet, Henry C., 1890, B. A., 100 Washington street, Chicago, Ill, Attorney-at-law.
Bennett, Samuel E., 1890, D. V. M., Kansas City, Mo., Government Meat Inspector.
Bently, William Preston, 1885, B. Agr. (B. A. 1890, M. A. 1893, Bethany College) 15 Miller Road, Shanghai, China, missionary.
Bertsch, Joseph Franz, 1896, LL. B., Columbus, 124 West Ninth avenue.
Bibbee, George E., 1897, LL. B. (A. B. Ohio Wesleyan University), Columbus, 41 King avenue.
Biebel, Herman Matthews, 1896, M. E. in EE., Chicago, Ill., electrical engineer with Western Electric Co.
Bischoff, John Wallace, 1899, E. M., Thomas, W. Va., assistant engineer Davis Coal and Coke Co.

Bissing, William, 1893, M. E. in EE. (A. B. Johns Hopkins University), examiner in U. S. patent office, Baltimore, Md.
Blackburn, Frank H., 1896, M. E. in EE., Fostoria, Electric Engineer, Fostoria Incandescent Lamp Co.
Blaire, Edward Grey, 1895, G. Ph., Shawnee, pharmacist.
Blakiston, Anna Houston, 1897, B. Ph., Mrs. Powell.
Blakiston, Mary, 1893, B. Ph., Columbus, teacher in East High School.
Blinn, Ray S., 1893, B. S.
*Bloom, Edwin M., 1893, B. Sc., died, 1894.
Bloom, J. George, 1889, C. E., Chillicothe, division engineer B. & O. S. W. Ry
Bloomfield, Lloyd Morris, 1891, B. Agr., Central America.
Bock, Harrison W., 1898, LL. B., 1899, B. Ph., Canton.
Bockius, Harry Graham, Ph. B. (Yale University), 1899, LL. B., Canton.
Bodman, Mary E., 1898, B. Ph., Bement, Ill.
Boesche, Felix John, 1896, G. Ph., Denver, Col.
Boesel, Frank Tilden, 1896, B. Ph., student, Harvard Law School.
Bogue, Ernest Everett, 1894, B. Sc. H. & F., 1896, M. Sc., Professor of Botany and Horticulture, Agricultural and Mechanical College, Stillwater, Okla.
Bohn, Frank A., 1900, B. Ph., Olmsted Falls.
Bohn, William Edward, B. A. (German Wallace College), 1900, M. A., Olmsted Falls.
Bond, Charles Grosvenor, 1899, LL. B., Columbus, 595 Oak street.
Bone, John H., 1893, B. Sc., 1896, B. Sc. (Agr.), New Richmond, Ind.
Booth, Lucy Adelaide, 1892, M. A. (B. A., Ohio Wesleyan University), 1894, Ph. D., Columbus.
Bope, George W., 1897, LL. B., Columbus, third assistant director of law, 275 East State street.
Bostwick, Homer Z., 1900, B. A., Columbus, Student O. S. U. Law School.
Bowden, Harry W., 1900., C. E., Minerva.
Bower, Jerome G., 1897, M. E., 295 North High, Columbus.
Bownocker, John A., 1889, B. Sc., 1897, D. Sc., Columbus, associate professor of Inorganic Geology, State University.
Boyd, Emma, 1888, B. Ph., 38 W. Woodruff ave., Columbus, teacher in the North High School.
Boyd, James Ellsworth, 1891, B. Sc., Columbus, assistant professor of Physics, State University.
Boyd, James G., 1897, D. V. M. Columbus.
Boyd, Martin L., 1897, LL. B., Columbus, 265 East Eleventh Ave.
Bradford, Ernst, 1892, G. Ph., Columbus, chemist, with N. W. Lord, O. S. U.
Bradford, Joseph Nelson, 1883, M. E., 54 West Tenth Ave., Columbus, associate professor of drawing, State University.
Brand, Harry Frank, 1896, B. Ph., 1897, LL. B., Worthington.
Brandt, James Herbert, 1899, B. A., Greencastle.
Brandt, Ulysses Sherman, 1895, B. A., Canal Winchester.
Braun, Joseph G., 1897, G. Ph., Columbus, 802 South Champion avenue, Pharmacist.
Brelsford, Harley, 1898, B. Ph., Christiansburg.
Brewer, Charles Reed, LL. B., Bowling Green.
Brewer, John Whitney, 1896, G. Ph., Columbus, 126 West Tompkins street, Pharmacist.
Bright, Frederick I., 1900., LL. B., Logan.
Britton, John Carr, 1898, B. Sc. (Agr.), Buffalo, N. Y.
Brier, Harvey E., 1890, D. V. M., Tippecanoe City, veterinary surgeon.

Bronson, Herman S., 1897, LL. B. (B. L., Cornell University), Columbus, Attorney, 120 Wilson avenue.

Brophy, James Francis, 1899, E. M., Sun, W. Va., Sun Coal and Coke Co.

Brown, Frank, 1899, M. A. (A. B., Macalester College), Columbus, teacher in High School.

Brown, Frederick W., 1888, E. M., Superintendent of Colorado Portland Cement Co., Florence, Colorado.

Brown, Newton H., 1893, M. E. in EE., Newark, Del., professor of Electrical Engineering, Delaware College.

Bruce, Charles A., 1895, B. A., Columbus, assistant professor of Romance Languages, State University.

Brumley, David, 1895, C. E., Louisville, Ky., with L. & N. Ry.

Bruning, Henry Dietrick, 1896, C. E. Pittsburg, Pa., engineer on P., C., C. & St. L. R. R.

Buchenberg, Alvin E., 1900, M. E. in E. E., Holgate.

Buckman, Arthur Leslie, 1897, M. E., in EE., Central Union Telephone Co., Toledo.

Buckman, Ola., 1895, B Sc. (M. D., Cleveland University of Medicine and Surgery), Norwalk.

Bunnell, Larone A., 1898, G. Ph., Dayton, Pharmacist.

Burgess, James Henry, 1900, B. Ph., Big Horn, Wy.

Burkett, Charles William, 1895, B. Sc. (Agr.), 1898, M. Sc. (Agr.), Durham, N. H., professor of Agriculture, New Hampshire State College.

Burkett, Dora Van Buren, 1897, B. Ph., Columbus.

Burns, James Ferguson, 1891, C. E., Hopkinsville, Ky., assistant engineer L. & N. Ry.

Burr, Harriett G., 1897, B. A., Worthington.

Butler, James Marion, 1894, LL. B. (A. B., Ohio Wesleyan University), Carmel.

Butterworth, William H., 1898, B. A., Columbus, 45 North Seventeenth street.

Bygate, Harry Goldsmith, 1899, M. E., Draftsman, Homestead Steel Works, Homestead, Pa.

Byers, Clara, 1894, B. Ph., Mrs. Coles A. Raymond, Youngstown, O.

C

Cahen, Alfred, 1894, LL. B., Allegheny, Pa.

Calkins, George Herbert, 1895, M. E. in EE., with Gen. Electric Co. Testing Department, Schenectady, N. Y.

Calkins, William Bartlett, 1898, G. Ph., New Straitsville, Chemist, Steel Works.

Callender, Sherman D., Ph. B. (Oberlin College), 1898, LL. B., 326–330, The Nasby, Toledo, Attorney.

Calvin, Anthony B. (A. B. Northeastern Ohio Normal), 1900, LL. B., Youngstown.

Canfield, Charles H., 1897, D. V. M., Government Meat Inspector, Kansas City, Mo.

Canfield, Dorothea Francis, 1899, B. Ph., graduate student, Columbia University, New York City.

Canfield, Leander Randall, 1896, B. Ph., Chardon.

Capron, Marshall Fremont, 1888, M. E., architect, Cleveland.

Carr, Hugh Stanley, 1896, M. E. in EE., assistant professor Electrical Engineer, Lawrence, Kansas.

Carr, James Gray, 1897, B. A., Coshocton.

Carroll, Patrick Henry, 1894, E. M., Herrin, Illinois, Supt. Big Muddy Coal and Iron Co.

Carroll, William Hunt, 1894, LL. B., Wilmington.
Carson, Samuel King, 1895, M. E. in EE., M. D. (Ohio Medical University), Acting Assistant Surgeon U. S. A., Manila, P. I.
Cary, Charles R., 1900, LL. B., Millersburg.
Cathcart, Josephine M., 1888, B. Sc., 1131 Cedar avenue, Cleveland, accountant.
Catlin, Homer Clark, 1896, C. E., Bridge Department, N. Y. C. R. R., Grand Central Station, N. Y.
Canaga, George Orlando, 1895, LL. B. (B. A., Scio College).
Cartwright, Henry Gilroy, 1895, LL. B.
Cavanaugh, Andrew F., 1900, M. E., Dayton.
Cellarius, Frederick Julius, 1888, C. E., Dayton, civil engineer.
Chamberlain, Helena W., 1884, B. A., Mrs. Ellis Lovejoy, Union Furnace.
Chalmers, Agnes Florida, 1895, B. Ph., Bay City, Mich., teacher in High School.
Chappell, Walter Evans, 1898, M. E. in EE., first-class electrician, U. S. S. *Chicago*, care U. S. Despatch Agent, New York.
Charters, William Filson, 1887, B. Ph., Sidney, tax inquisitor.
Cherryholmes, W. K., 1881, B. Sc., M. D., Hamilton, physician.
Cilley, Raymond, 1896, C. E.
Clark, Alexander B., A. B. (Yale University), 1899, LL. B., Canton.
Clark, Clarence J., 1899, C. E.
Clawson, Clarence Alfred, 1899, B. Sc. (Agr.), 1900, D. V. M., Okena.
Clay, Albert Arlington, 1893, LL. B. (B. A., Tri-State Normal College), Hicksville.
Claypoole, Bessie Smith, 1895, B. Ph., Columbus, student, 1080 North High St.
Claypool, Charlotte Lake, 1892, B. Ph., Columbus, 1080 North High St.
Clements, Frank Orville, 1899, M. Sc. (M. A., Otterbein University), Westerville.
Clum, George V., 1893, B. A., Mendota, Ill., president of Mendota College.
Clum, Harry Ernest, 1899, B. Ph., Westerville.
Cockins, Edith D., 1894, B. A., Columbus, registrar, State University.
Coddington, Edwin F., 1896, C. E., 1897, M. Sc., fellow in Astronomy, Lick Observatory, Mount Hamilton, California.
Cole, George Nathan, 1891, M. E., in EE., Chicago, Ill., 112 Clark street.
Cole, Marietta C., 1897, B. Ph., Columbus, 897 Franklin avenue.
Collins, Curtis, 1895, M. E. in EE., Salesman, General Electric Co., Baltimore, Maryland.
Coney, William Hawks, 1894, B. Sc., Honolulu, S. I.
Connell, Laura Jewell, 1896, B. Ph., Columbus, teacher of German, 433½ Long street.
Connell, William A., 1886, E. M.
Connor, Alice M., 1900, B. Ph., Columbus.
Connor, Ellen J., 1900., B. Ph., Columbus.
Converse, Edward Jasper, 1886, B. A. (B. D., Yale University), Columbus, assistant pastor, First Congregational Church, 808 North High street.
Converse, Howard Pendleton, 1887, B. Sc., 166 Devonshire street, Boston, Mass., manager Boston office Cooper, Hewitt & Co., steel and iron manufacturers.
Converse, Walter, 1899, B. A., Plain City.
Conway, Hugh Lawrence, 1896, C. E., assistant engineer, Water Works, Cincinnati.
Cope, Albert N., 1897, M. E. in EE., Columbus, foreman Columbus Street R. R.
Corner, Florence, 1897, B. Ph., Columbus, 642 East Rich street.
Corns, Harry, 1887, B. A., Columbus, teacher in Central High School.
Corwin, Edwin E., 1880, B. A., Columbus, attorney-at-law, 1462 Neil avenue.

Cotes, Albert E., 1897, B. Sc., Columbus, medical student, Ohio Medical University.
Courtright, J. Loring, 1900, B. A., Circleville.
Coursault, Ida May, 1899, B. Ph., Columbus, 770 East Long street.
Coursault, Jesse H., 1893, B. A., 1898, M. A., Columbus, teacher in Central High School.
Covell, Vernon Royce, 1895, C. E., Pittsburg, Pa., county engineer's office.
Craig, Moses, 1889, B. Sc. (M. S., Cornell University, 1890), 1896, M. Sc. (H. F.), Auburn, Ala., assistant in Horticulture Experiment Station.
Cratty, John Mason, 1897, B. Sc., Cincinnati, chemist.
Crawford, Ira, Jr., 1893, LL. B. (B. S., Denison University), Dayton.
Crawford, William Sterling, 1888, B. Ph.
Croll, Alfred J. (A. B., Ohio Normal University), 1900, LL. B., Tontogany.
Cromley, Alva M., 1897, G. Ph., pharmacist, Circleville.
Crooks, Charles Melvis, 1892, B. A. (D. D., Harvard University, 1896), Colerain, Mass., pastor Congregational church.
Crowner, Delbert Alonzo, 1896, B. Sc. (Agr.), Wellsville, N. Y.
Cummins, Henry Rollins, 1891, G. Ph., Akron, pharmacist.
Cunningham, Arthur, 1880, B. A., 107 Lincoln street, Columbus, book-keeper.
Cunningham, Edward Walker, 1894, C. E., civil engineer, Schoenberger Wks. Am. Steel and Wire Co., Pittsburg, Pa.
Cunningham, George S., 1886, B. Ph., LL. B., Lancaster, attorney-at-law.
Cunningham, John Ferguson, 1897, B. Sc. (H. & F.), 1899, M. Sc. (H. & F.), Cleveland, assistant editor "Ohio Farmer."
Curtis, Leigh Goodrich, 1899, C. E., Zanesville, Dept. M. of U., B. & O. R. R.

D

Daily, Henry G., 1892, D. V. M., Wooster, veterinary surgeon.
Dally, John Randolph, 1899, LL. B., Centerburg.
Damron, Carson W., 1897, M. E., Columbus, Jeffrey Mfg. Co.
Daniels, David Edwin, 1893, LL. B., B. Ph., Denison University), 1896, LL. M., Columbus, 1326 Madison avenue.
Darby, Roscoe B., 1900., LL. B., Wauseon.
Davenport, Adrian E., 1897, B. A., Columbus, 1449 Franklin avenue.
Davidson, David Millen, 1894, B. A.
Davidson, George Edwin, 1899, LL. B., East Liverpool.
Davies, Jennie C., 1897, B. Ph., Columbus, 590 East Spring street.
Davies, John Lodwick, 1894, LL. B., Columbus.
Davis, Charles William, 1894, E. M., Colorado Springs, Col., care J. Mck. Terriday & Co.
Davis, Oscar Allen, 1897, M. E. in EE., Alliance, draughtsman Morgan Engineering Co.
Davis, Vernon Hays, 1900, B. Sc. (Agr.), Byesville.
Deahl, Walter Smith, 1896, C. E., 268 Fisk St., Pittsburg, Pa., Pittsburg Bridge Co.
Deardurff, Carl Mason, 1895, B. A.
DeLamater, Clayton William, 1884, A. B., LL. B., Omaha, Neb., attorney-at-law.
DeLoffre, Andre, 1896, M. E. in EE., Schenectady, N. Y., Engineering Department General Electric Co.
DeLoffre, Samuel Middleton, 1895, B. A.
Dennis, Jerry, 1892, LL. B., 1893, LL. M., Columbus, attorney-at-law, 690 Franklin avenue.

Derby, Florence Harlow, 1896, B. Ph., Columbus, graduate student, State University, 93 East Fifteenth avenue.
Detmers, Frederica, 1887, B. Sc., 1891, M. Sc., 1315 Neil avenue, Columbus, teacher.
Devol, William Stowe, 1886, B. Agr., Riverside, Cal.
Dice, Jesse Peck, 1898, LL. B., Akron.
Dickinson, Thomas Herbert, 1899, B. Ph., N. Y. City, graduate student Columbia College.
Diemer, Hugo, 1896, M. E. in EE., Greenwood, N. C., professor of mechanical engineering, A. & M. College.
Dietrich, Charles Henry, 1878, B. Sc., with American Book Co., general manager for Kentucky.
Dietrich, George C., 1898, B. Ph., Groveport, principal of High School.
Dill, Dille Augusta, 1900, B. Ph., Columbus.
Doan, Frank C., 1898, B. Ph., Athens, professor of philosophy, Ohio University.
Dollison, Harvey C., 1900, B. Sc., Columbus.
Doney, Carl Gregg, 1891, B. Sc., 1893, LL. B., Delaware, pastor M. E Church.
Donham, Maurice, 1896, M. E., Struthers, Wells & Co., Warren, Pa.
Donham, William W., 1882, B. Sc.
Dowd, Charles F., 1900, B. Ph., Toledo.
Dresbach, Melvin, 1897, B. Sc., Columbus, Fellow in Physiology, State University.
Drummond, William G., 1900 M. E., Cleveland.
Dubois, Wilbur L., 1900, B. Sc., Columbus, Fellow in Chemistry, State University.
Dun, George William, 1884, B. Sc., Columbus, business manager "Columbus Citizen."
Dun, John J , 1883, E. M., Fifteenth avenue, Columbus, consulting engineer.
*Dun, Walter Angus, 1878, B. Sc., M. D., died November 7, 1887.
Dungan, Irvine Laird, 1892, B. Ph., Cincinnati, Lane Theological Seminary.
Dunlap, Thaddeus Cox, 1895, M. E. in EE., consulting engineer, 8 West Seventh street, Chattanooga, Tenn.
Dunlap, William Renick, 1895, B. Sc., Kingston, farmer.
Dunlap, Robert R., 1900, M. E. in EE., Columbus.
Dunnick, Edward, 1897, C. E., Mt. Vernon Bridge Co., Mt. Vernon, O.
Duvel, Joseph W. T., 1897, B. Sc., Wapakoneta
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E

Eagleson, Grace, 1897, B. Ph., Columbus, 601 Oak street.
Eagleson, John H., 1900., B. A., Columbus, 601 Oak street.
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Early, Franklin E., 1893, D. V. M.
Easterday, Charles Todd, 1891, G. Ph., Wellston, Druggist.
Eddy, William, 1900, D. V. M., Cleveland.
Edwards, Mary Winifreda, 1897, B. A., New Richmond, Prin. of High School.
Egbert, Knott C., 1890, B. Agr., Yainax, Oregon, Supt. Indian Boarding School
Eisenbise, Bertha, 1900, B. Ph., Columbus.
Eisenlohr, Berthold A., 1898, B. Ph., Corning, mining engineer.
Ellis, Charles, 1898, D V. M., 3230 Locust street, St. Louis Mo., veterinarian.
Emery, Peyton Randolph, 1893, LL. B., London.
Emery, Vernon Judson, 1887, B. A. (A. M., University of Nebraska), Cleveland. assistant professor of Latin, Western Reserve University.

Erf, Oscar, 1899, B. Sc. (Agr.), Champaign, Ill., Instructor in Dairying, University of Illinois.
Erskine, John H., 1886, E. M., Lowellsville, fire brick manufacturer.
Estep, Frank Leslie, 1898, M. E. in EE., Draughtsman, Schoenberger Works, American Steel and Wire Co., Pittsburg, Pa.
Evans, Ernest, 1892, B. Sc., Mingo Junction, chemist, Laughlin Junction Steel Co.
Evans, Peter Platter, 1892, C. E., Boston, Mass., with King Bridge Co.
Evans, William Lloyd, 1892, B. Sc., 1896, M. Sc., Colorado Springs, Col., teacher of chemistry in High School.
Eysenbach, Ernest E., 1896, E. M., Columbus, Superintendent Columbus Gas Co

F

Fairchild, Harmon Scott, 1894, LL. B., Springfield.
Farber, Charles Harker, 1894, B. A., Columbus, with State Savings Association.
Fassig, Oliver L., 1882, B. Sc., Baltimore, Md., instructor in Climatology, Johns Hopkins University.
*Fay, Frederick Willis, 1882, B. A., B. Arch., died August, 1892.
Fay, Mona, 1897, B. Ph. (Mrs. Eugene Gee), Wheeling, W. Va.
Feicht, Russell Stimson, 1890, M. E. in EE., Engineering Department Westinghouse E. & M. Co., Pittsburg, Pa
Feiel, Ida Louise, 1898, B. Ph., Columbus, 520 East Main street.
Fenner, Jessie Albertus, A. B. (Wittenberg College), 1898, LL. B., Shiloh.
Fergus, Guy Carlton, 1898, M. E. in EE., partner in Zanesville Electrical Co.
Fergus, John Franklin, 1892, LL. B., Columbus, attorney-at-law.
Fickes, Walter M., 1900, E. M. (Ceramics) Steubenville.
Finley, Harry Marshall, 1894, B. A., McConnelsville, principal of High School.
Fippin, Elmer Otterbein, 1900, B. Sc. (Agr.) Briggsdale.
Fischer, Paul, 1891, B. Agr., D. V. M., professor of Veterinary Medicine, Manhatten, Kas.
Fischer, Robert, 1895, G. Ph., 1896, M. Ph., 1898, B. Sc., Ithaca, N. Y., laboratory assistant, Cornell University.
Fischer, Walter, 1897, B. Sc., Columbus, 810 Franklin avenue.
Fish, Fred Alan, 1898, M. E. in EE., Columbus.
Fisher, Clara, 1886, B. A., Mrs. J. Porter Milligan, Columbus.
Fisher, Georgietta, 1895, B. A., teacher in High School, Ottumwa, Iowa.
Fisher, Ida May, 1900, B. Ph., Columbus.
Fitzgibbon,, James Robert, 1894, LL. B., Newark.
Fitterer, John Conrad, 1898, B. Sc., Butler.
Flickinger, George A., 1898, B. Sc., (Agr.), Knoxville, Tenn., Dairyman at University of Tennessee.
Floto, Julius, 1889, E. M., Chicago, Ill., Monadnock Building, with C. L. Strabel.
Flynn, Benjamin H., 1898, C. E., Columbus, with State Board of Health.
Flynn, Harry Franklin, 1892, C. E., Washington, D. C., U. S. Geodetic and Coast Survey.
Flynn, Maud, 1896, B. Sc., Columbus, student, Columbus Normal School, 40 East Fifth avenue.
Flynn, Oscar Rodgers, 1896, B. Sc., teacher in High School, Columbus.
Foley, William J., 1894, D. V. M., Lexington, Ky.
Ford, Ruth L., 1898, B. A., Ashtabula, teacher in High School.
Ford, Stanley Hamer, 1898, B. Ph., 1st Lieut. in U. S. Army.
*Forgy, Ralph Morris, 1896, B. Ph., died March, 1899.

Foster, Dudley Hampton, 1895, B. Ph., LL. B., attorney-at-law, Corning.
Foster, Frank McMillan, 1894, M. E. in EE., with John N. Poage, Cincinnati, manufacturer water columns and valves.
Foster, Israel Moore, 1898, LL. B., Athens.
Foulk, Charles William, 1894, B .A., student, in Germany.
Fowler, Harry R., 1894, M. E. in EE., Toledo, electrical contractor.
Fox, Charles P., 1890, B. Agr., 1895, M. Agr., Columbus.
Fox, Frederick Hugh, 1896, B. Ph., McConnelsville.
Fox, John Herbert, 1897, M. E., Cleveland, Brown Hoisting Machine Co.
Fox, Ross G., 1900, B. Ph., Columbus.
Francis, Edward, 1894, B. Sc., M. D. (Ohio Medical College), Assistant Surgeon, U. S. Marine Hospital, Stapleton, S. I., N. Y.
Francis, Mark, 1887, D. V. M., College Station, Brazos Co., Tex., professor of Veterinary Medicine, Agricultural and Mechanical College.
Frankenberg, John Theodore, 1899, M. E., in EE., Columbus, 851 Neil avenue.
Fravel, George B., 1888, M. E., Road Foreman of Panhandle Lines, Cincinnati, O.
Frayer, Lee Ambrose, 1896, M. E., Columbus, Rarig Engineering Co.
Freeman, Stanton Sholes, 1898, E. M., St. Carbon Iron and Steel Co., Parryville, Pa.
French, Thomas Ewing, 1895, M. E., Columbus, assistant professor of drawing, State University, 1458 Worthington street.
Fritchle, Oliver Parker, 1896, B. Sc., Mt. Hope.
Frost, George W., 1900, M. E., Columbus.
Fullmer, Edward L., 1897, B. Sc., 1898, M. Sc., Mitchell, S. D., University of South Dakota, professor of sciences.
Fullerton, Charles Haywood, 1898, B. Ph., Wheelersburg.

G

Gains, Charles E., 1889, B. Ph., London, physician.
Galbraithe, John Howard, 1883, B. Ph., Columbus, journalist, 1087 Oak street.
Gale, Cora C., 1893, B. Ph., Columbus, Oak street, near Grant.
Gale, Franklin Henry, 1893, LL. M. (LL. B., University of Michigan), Columbus, 324 Oak street.
Gallen, William Francis, 1897, M. E., Columbus, Jeffrey Manufacturing Co.
Game, Reed Haskell, 1896, B. Ph., 1899, LL. B., Columbus.
Gamper, Hedwig E., 1900, B. Ph., Columbus.
Gamper, Herman, 1899, M. E., Ingersoll-Sargent Drill Co., Easton, Pa.
Gayman, Charles W., 1900, B. Ph., Van Wert, Principal of the High School.
Garber, Alberta D., 1889, B. Ph., A. M.
Garber, John Murray, 1897, C. E., Columbus, Mt. Vernon Bridge Co.
Garber, Levi L., 1898, B. A., Belleville.
Garst, William Augustus, A. B. (Otterbein University and Harvard University), 1898, LL. B., Westerville.
Gee, Eugene C., 1897, M. E. in EE., Wheeling, W. Va., with Telephone Co.
Gehrkens, Edward Frederick, 1894, M. E. in EE., Schenectady, N. Y., with General Electric Co.
Geissinger, James Allen, 1895, B. A., Pastor Centenary M. E. Church, Ripley, Ohio.
Genheimer, Eli Thomas, 1896, B. Ph., Portsmouth, teacher in High School.
Genheimer, William F., 1897, LL. B., Portsmouth, attorney.
Gibbs, George C., 1893, B. A., Columbus, with Green, Joyce & Co.
Given, James Byron, 1896, M. E. in EE., Western Electric Co., Chicago, Ill.
Givens, Newton Edgar, A. B., 1896, LL. B., Waverly.

Glover, Sioux, 1882, B. Sc., Mrs. Horton, Errid, Pa.
Goddard, Loring Hapgood, 1892, C. E., farmer. Manora, O.
Good, Paul Revere, 1899, B. A., 1900, M. A., Westerville.
Goodell, Ralph Spencer, 1892, C. E., Mt. Vernon, Mt. Vernon Bridge Co.
Goodman, Joseph Clarence, 1896, LL. M., Columbus, 375 East Town street.
Goodman, Sylvester Jacob, 1896, G. Ph., Philadelphia, Pa., student of Medicine, W. & J., Medical College.
Gordon, Adelaide Cummins, 1896, B. Ph., Columbus.
Graham, Emery Eugene, 1898, M. E. in EE., Alliance, Morgan Engineering Co.
Grandle, Frank Albert, 1891, G. Ph., Centerburg, pharmacist.
Grate, Charles Artemis, 1898, M. E.
Graves, William L., 1893, B. A., 1897, M. A., assistant professor in Rhetoric, State University.
Gray, Genevieve, 1898, B. Ph., Columbus.
Gray, James Collam, 1892, LL. B., 1893, LL. M., Pittsburg, Pa., attorney P. R. Ry.
Graven, D. Homer (A. B., Ohio Normal University), 1900, LL. B., Nashville.
Green, Charles C., 1885, B. Sc., M. D., Beaver City, Neb., physician.
Green, Jerome Joseph, 1893, M. E. in EE., Notre Dame, Ind., Notre Dame University, professor of Physics and Elec. Engineering.
Green, Joseph Faust, 1899, M. E. in EE., Moline, Ill., electrical engineer, Moline Electric Elevator Co.
Green, Robert Lee, 1892, G. Ph., Somerset.
Gregg, Frank B., 1889, B. Ph., M. D.
Gregory, Hiram D., 1880, E. M., attorney-at-law, Covington, Ky.
Griffin, Mark H., 1897, M. E. in EE., Xenia, electrical engineer, Soldiers' and Sailors' Orphans' Home.
Griffin, Theodore L., 1889, B. Sc., M. Sc., Columbus, chemist, 760 Mt. Vernon avenue.
Griffith, David Mathias, 1896, LL. B., Kecksburg, Pa.
Griffith, Wellington John, 1892, LL. B., Tiffin.
Griffiths, Benjamin Lincoln, 1898, LL. B., Vaughnsville.
Grimsley, George Perry, 1890, B. A., 1891, M. A. (Ph. D., Johns Hopkins University, 1894), Topeka, Kan., professor Natural History, Washburn College.
Griswold, Lawrence William, 1892, B. A., New York City, London Assurance Co
Groff, Orsylla Ann, 1894, G. Ph., North High street, Columbus, pharmacist.
Groff, Warren Noble, 1896, B. A., 1899, LL. B., Tiffin.
Groves, John Wesley, 1898, C. E., engineer for Sunday Creek Coal Co., Corning.
Gruen, Francis William, 1899, B. Ph., 1899, LL. B.
Guerin, Martha, 1896, B. Ph., Columbus.
Gugle, George Linville, 1896, LL. B., Columbus, attorney.
Gugle, Marie, 1897, B. A., Alexandria, Ind., teacher.
Guittard, Virgil, 1894, B. Sc., New Bedford.
Guitteau, William B., 1897, B. Ph., Toledo, teacher in High School.
Guss, Sherman Hamlin, 1892, B. A., Clarksburg, W. Va., principal of the colored schools.

H

Haas, Frank, 1895, C. E., 1896, E. M., Middlesboro, Ky., Virginia Iron, Coal and Coke Co.
Hagler, Howard, 1889, B. Sc., Washington C. H., farmer.
Haigler, Charles Edmund, 1898, B. Sc., Xenia, O.
Hale, Frederick James, 1898, M. E., 1900, M. Sc., Columbus.

Hall, Harry R., 1889, E. M., Middlesboro, Ky., Virginia Coal, Iron and Coke Co.
Halterman, Oscar Elmore, 1895, LL. B., B. S. (National Normal University).
Hamilton, Charles R., 1893, B. A., Zanesville, Dun's Commercial Agency.
Hamilton, Frank Alexander, 1895, D. V. M., Dubois, Pa., veterinary surgeon
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Hammond, Harry J., 1900, D. V. M., Sharon Centre.
Hammond, Rose Lyttle, 1896, B. Ph., Columbus, teacher, 90 North Twenty-second street.
Hancock, Winfield Scott (A. B., Marietta), 1900, LL. B., Marietta.
Hancock, David R., 1889, G. Ph., M. D., Columbus, Physician.
Haney, Thomas Carlyle, 1894, G. Ph., Columbus, pharmacist, corner Schiller and Third streets.
Hannum, William Hamilton, 1897, B. A., India, missionary.
Harbage, Arnett, 1893, D. V. M., West Jefferson, farmer.
Harkins, Robert R., 1900, M. E. Columbus.
Harlor, John David, 1895, B. A., Columbus, teacher in Central High School.
Harper, Ellahue A. (B. A., Ohio Wesleyan University), 1900, LL. B., Columbus.
Harris, Charles Pearl, 1899, B. Ph., West Liberty.
Harris, Frank Laverne, 1894, LL. B. (Ph. B., Tri-State Normal University), Payne.
Harris, Walter Conger, 1893, B. Sc., New York, with Art Department of Herald, 104 West 114th St.
Harrison, Warner, 1892, LL. B., East Town street, Columbus, attorney and solicitor C., A. & C. Railway.
Harrison, William Henry, 1885, C. E., Butte, Montana, assistant engineer Butte City Water Works.
Harrold, Ernst Ellwood, 1895, G. Ph., dispenser chemical store-room, State University.
Harrop, Herbert Bailey, 1898, B. Sc., Columbus, 1323 Forsythe avenue.
Hartsough, William H., Jr., 1898, B. Ph., Columbus, 1356 Hunter avenue.
Hartwell, Arthur, 1888, M. E., Chicago, Ill., manager Chicago office Westinghouse E. & M. Co.
Hartwick, Louis M., 1897, M. E., Draftsman in Steel Works, Johnstown, Pa.
Harvey, Arlington Corylle, 1896, B. Ph., 1897, M. A., 1899, LL. B., Columbus, 145 King avenue.
Harvey, Emory Wayland, 1896, B. Ph., 11 East Sixteenth street, New York City, Milton Bradley Co.
Harvey, Florence Danford, 1898, B. Ph., Mt. Perry.
Harvey, Sherman Lee, 1896, G. Ph., Harrisburg, Druggist.
Harward, Arthur B., 1900, B. A., Columbus.
Hassler, Robert Hanich, 1892, M. E. in EE., electrical engineer, Indiana Bicycle Co., Indianapolis, Ind.
Hastings, Edwin George, 1898, B. Sc., Austinburg.
Hayes, Seth, 1892, B. Sc., Fremont, principal of High School.
Hayman, William C., 1900, M. E. in EE., Holgate.
Hayward, George E., 1893, C. E., New Philadelphia, surveyor of Tuscarawas county, Ohio.
Hazelton, Bird, 1898, B. Ph., New Straitsville.
Hazlett, Robert, Jr., 1887, C. E., Wheeling, W. Va., engineer for Ohio Company.
Heacock, William Preston, 1898, LL. B., Cardington.
Heath, Arthur T., 1887, G. Ph., Oak Harbor, analytic chemist, consulting engineer and contractor.
Hebble, Charles Roy, 1896, M. E. in EE., Cincinnati, electrical engineer.

Hedges, Harry, 1888, B. A.
Heller, Albert Henry, 1890, C. E., Youngstown, Youngstown Bridge Co.
Henderson, Adelbert Andrew, 1898, C. E., Columbus, City Engineer Corps.
Henretta, Charles Michael, 1896, E. M., Buffalo, engineer J. W. Ellsworth Coal Co.
Herbert, Charles T., 1897, LL. B., Columbia, South America.
Herms, Edith S., 1898, B. Ph., Portsmouth.
Herrick, Louise, 1893, B. A. (Mrs. Harry Abbott), Columbus, 1454 Highland St.
Hershey, Harry Hartman (A. B., Mt. Union College) 1900, LL. B., East Greenville.
Hertner, John H., 1899, M. E. in EE., Dayton.
Hess, Florence Louise, 1895, B. Ph., Columbus.
Hewitt, Strafford Reaves, 1898, M. E. in EE., Columbus Belting and Packing Co.
Hiatt, William Arthur, 1895, B. Ph., New York City, teacher in Stevens School, Hoboken, N. J.
Higbee, Charles E., 1883, B. Sc.
High, Odessa, 1896, B. A., West Jefferson.
Hill, Frank E., 1886, B. Sc., M. D., Muncie, Ind.
Hill, I. T. Reynolds, 1896, B. Sc. (H. & F.), Toledo, O., paymaster for Woolson Spice Co.
Hine, James S., 1893, B. Sc., Columbus, assistant professor of Entomology, State University.
Hine, Lucius A., 1888, E. M., 140 50th street, Chicago, Ill., President and Treasurer Hine–Watt Manufacturing Co.
Hipple, John Merton, 1898, M. E. in EE., Westinghouse E. & M. Co., Wilkinsburg, Pa.
Hirsch, Gustav, 1897, M. E. in EE., Columbus, engineer, Citizen's Telephone Co.
Hirst, Anna Brewster, B. A. (Antioch College), 1900, M. A., Yellow Springs.
Hoel, Sarah Elizabeth, 1893, B. Sc. (Mrs. W. M. Mills), North Tonawanda, N. Y.
Hoffman, Arthur Sullivant, 1897, B. A., Troy.
Hoffman, Hattie D., 1900, B. Ph., Columbus.
Homan, Frank, 1895, C. E., Cannelton, W. Va., Raven Coal and Coke Co.
Hood, Sherman, 1894, B. Sc., Meander, gardner.
Hoover, Frederic Roland, 1899, B. Ph., Columbus.
Hopkins, Charles Delnow, 1893, LL. B. (B. A., Ohio Wesleyan University), Athens.
Horton, Henry Pomeroy, 1889, B. Ph.
Hough, Benson Walker, 1899, LL. B., Delaware.
Houseman, Ruth U., 1897, B. Ph., Painesville, teacher in High School.
Houston, Anna Christine, 1892, B. Ph., 1895, M. A., Marysville.
Hovey, Clark Samuel, B. A. (Buchtell College), 1898, LL. B.,
Howald, Ferdinand, 1878, B. Sc., Rush Run, W. Va., manager of mining operations.
Howard, A. B., 1883, B. Ph., Jackson, Miss., clergyman.
Howard, Anna F., 1900, B. Ph., Columbus, 307 West Seventh avenue.
Howard, Curtis C., 1878, B. Sc., M. Sc., 115 Jefferson avenue, Columbus, professor of Chemistry in Starling Medical College.
Howard, Fanny Fern, 1896, B. A., Columbus.
Howard, Edward Davenport, 1894, LL. B., 1896, LL. M., Columbus, attorney.
Howard, John Wilmot, 1895, B. Sc., Columbus, assistant secretary, Board of Trade.
Howells, E. S., 1884, E. M., Massillon, Howells Mining Company.
Howells, Thomas J., 1897, E. M., Steubenville, O., Mingo Works National Steel Co., Mingo Junction, O.

Hubbard, Ralph Newton, 1891, B. Sc., Columbus, Columbus Machine Co.
Hughes, Raymond Mollyneaux, A. B. (Miami University), 1897, M. Sc., Miami University, professor of Chemistry.
Huddleson, Don Carlos, 1897, G. Ph., Columbus, assistant in Gymnasium, State University.
Huffman, Lillian Stuart, 1899, B. Ph., Columbus, 389 East Rich St.
Huggins, Burch Delaplaine, 1899 B. Ph., Hillsboro.
Hull, Mary Louise, 1894, B. A. (Mrs. C. H. Farber), Columbus, 392 West Seventh avenue.
Humphrey, J. Scott, 1879, B. Sc., Findlay, civil engineer.
Humphreys, Leona, 1895, B. A., Plain City, teacher in High School.
Hunt, William Franklin, 1887, M. E., attorney-at-law, New York Life Building, St. Paul, Minn.
Hunter, Madone C., 1900, M. E. in EE., Salt Creek.
Huntington, Arthur, 1899, M. E., Turtle Creek, Pa., Westinghouse Electric Manufacturing Co.
Huston, Charles H., 1897, LL. B. (B. S., Tri-State College, Ind.), Mansfield.
Hyde, Wilby Grimes, 1887, B. A. (LL. B., Cincinnati), Chillicothe, attorney-at-law
Hyle, Charles A., 1896, M. E. in EE., U. S. Weather Bureau, Mt. Tamalpais, California.

I

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Ingram, Imogene, 1897, B. Ph., Columbus.
Innis, Lyman H., 1893, B. A., 1895, LL. B., Columbus, attorney, 323½ South High.
Ireland, Guy Llewellyn, 1895, M. E.
Irvin, Chadwick H., 1897, M. E., Lima, Draftsman, The Solar Refining Co.

J

Jackson, Frank Pierce, 1892, LL. B., 1893, LL. M., Columbus, attorney, 82 South Washington avenue.
James, Florence May, 1896, B. A. (Mrs. Oscar R. Flynn), Chicago, Ill.
Jaynes, Allan B., 1900, Washington, D. C., Census Department.
Jeffrey, James Fred, 1900, B. Sc., Columbus.
Jeffrey, Maud Dorothy, 1895, B. Ph., assistant in library, State University.
Jenkins, William B., 1893, C. E., Bellefontaine, District Agent Interstate Savings Investment Co.
Jenkins, Willis H., 1894, C. E., Columbus, Transitman, P., C., C. & St. L. Ry.
Jennings, Irvin G., 1899, LL. B., Zanesville.
Jennings, Levi E., 1897, M. E. in EE., Indianapolis, Ind., Central Union Telephone Co.
Johnson, Charles W., 1896, M. E. in EE., Norwood, Cincinnati, chief draughtsman Bullock Electric Mfg. Co.
Johnson, Earle S., 1900,, M. E. in EE., Plants.
Johnson, George Edward, 1892, C. E., L. & N. R. R., Louisville, Ky.
Johnson, Herbert Lincoln R., 1892, M. E. in EE.
Johnston, Frederick Symmes, 1899, B. Sc. (Agr.), Durham, N. H., assistant professor of Agriculture, New Hampshire State College.
*Jones, A. A., 1886, C. E., died May, 1894.
Jones, Arthur James, 1898, M. E. in EE., Turtle Creek, Pa., Westinghouse Electric and Manufacturing Company.

Jones, Aaron Wesley, 1891, B. Sc., Columbus, Gardner Insurance Agency.
Jones, Alexander Houston, 1895, M. E. in EE.
Jones, Benner, 1897, LL. B., Jackson.
Jones, Daniel D., 1893, G. Ph., Gallipolis, pharmacist, Epileptic Hospital.
Jones, Jesse Lee, 1890, B. A., Philadelphia, Pa., chemist, William Cramp & Sons, Ship Builders.
Jones, Paul, 1880, B. A., Columbus, attorney–at–law.
Jones, Pearl N., 1892, M. E. in EE., Pittsburg, Pa., engineer and salesman, Westinghouse E. & M. Co.
Jones, Richard Thomas, 1900, B. Ph., Columbus.
Jones, Smiley, 1894, E. M., Prescott, A. T.
Jones, William Francis, 1896, D. V. M., Cincinnati, Miami Medical College.
Judd, Horace, 1897, M. E., 1899, M. Sc., Brooklyn, N. Y., Instructor, Pratt Institute.
Judkins, Clyde H., 1897, LL. B. (A. B., Scio College), Flushing.
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K

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Keffler, Frederick, 1892, M. E., Anaconda, British Columbia, General Manager the British Columbia Copper Co., Ltd.
Keifer, William White, 1886, B. A. (LL. B., Cincinnati), Springfield, attorney–at–law.
Keiser, Romeo Orpheus, 1892, B. Sc., 1896, G. Ph., '98, M. D., O. M. U., '99 M. D., Cleveland Homeopathic Medical College, physician, Columbus.
Kellerman, Ivy, 1898, B. A., 1899, M. A. (Cornell University), Ithaca, N. Y., student, Cornell University.
Kellicott, William E., 1898, B. Ph., Columbia University, New York.
Kellison, Edward Lafayette, 1897, B. Ph., 1900, LL. B., Quincy.
Kemmler, Edward A., 1888, C. E., 895 S. High street, Columbus, assistant city engineer.
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Kershaw, Francis Stewart, 1891, B. Ph., Boston, Mass.
Kershaw, Samuel Charles, 1892, B. Ph., Columbus, book–keeper, Columbus Bolt Works.
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Kiesewetter, Louis Frank, 1891, C. E. (A. B., Harvard, '92, and A. M., '93), Columbus, Cashier Ohio National Bank.
Kiler, Abdel William, 1896, G. Ph., druggist, Columbus, Eighth and High streets.
Kinder, Gordon D., 1900, B. Ph., Ottawa.
Kimberley, Charles H., 1900, B. Sc., Pharmacy, Columbus.
King, Robert James, 1899, B. A., Zanesville.
Kirby, Harriet R., 1898, B. A., Columbus, teacher in North High School.

Kirker, Harry L., 1889, B. Sc., with the Westinghouse Company, Sodelee Boite 56, Havre, France.
Kiser, Katherine Daniel, 1895, B. A., Columbus, teacher in High School.
Klein, David, 1900, B. Ph., Columbus.
Kline, Charles H., 1897, M. E. in EE., Dayton, city engineer and deputy county surveyor.
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Knight, Caroline E., 1900, B. Ph., Columbus.
Knight, Ruby Ray, 1895, B. Sc., Middleport.
Knight, William A., 1900, M. E., Columbus, instructor in shopwork, State University.
Knopf, Eva S., 1895, B. Ph., Columbus, teacher in North High School.
Knopf, George W., 1883, B. Sc., Pittsburg, Pa., bridge builder.
Knox, Frank Stewart, 1900, E. M., Columbus.
Kohr, Donald Alexis, 1898, B. Ph., Westerville.
Krauss, Bertha Katherine, 1892, B. Ph., Ottawa.
Kreiger, Charles Henry, 1887, G. Ph., Columbus, superintendent the Kauffman-Lattimer Co.
Krumm, Charles S. M., 1896, B. Ph., 1898, LL. B., Columbus, attorney, 277 South Eighteenth street.
Krumm, Herbert Zettler, 1898, B. Ph., Columbus, 975 South High street.
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Krumm, Louis Ralph, 1898, M. E. in EE., Engineering Department Central Union Telephone Co., Chicago, Ill.
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Kuhn, Valley Howard, 1896, M. E. in EE., Etna.
Kuhn, Harry Waldo, 1897, B. Sc., graduate student, Cornell University.

L

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Lamme, Bertha A., 1893, M. E. in EE., Pittsburg, Pa., Westinghouse E. & M. Co.
Landacre, Francis Leroy, 1895, B. A., assistant professor of Zoology and Entomology, State University.
Landacre, Walter Alexander, 1891, G. Ph., Columbus, assistant professor of pharmacy.
Landis, Walter Victor Titus, 1895, B. Ph., Dayton.
Lane, Quinton R., 1898, B. Ph., 1900, LL. B., Attorney, Columbus.
Large, Joseph H., 1890, C. E., Whigville, O.
Laughlin, Hugh Clarence, 1890, B. A. (A. M., 1895, University of Nebraska), 1712 Bathgate avenue, New York, teacher in High School for Boys and Girls.
Lavery, William F., 1890, D. V. M., veterinary surgeon, State University.
Lawrence, Arthur K., 1897, G. Ph., Columbus, 69 North Seventeenth street, Pharmacist.
Layton, Roy Everett, 1895, B. A., 1897, LL. B., Wapakoneta, attorney.
Lee, Corless E., 1900, M. E. in EE., Speidel.
Lee, Edwin S., 1893, G. Ph., Columbus, druggist, 144 West Ninth avenue.
Lee, Robert M., 1897, M. E., Columbus.

Leffler, Edward Victor, 1896, G. Ph., Leipsic.
Lehman, John Wesley, 1899, B. Ph., Canal Winchester.
Lemert, Helen Ora, 1894, B. A., Columbus, teacher High School, 81 Twenty–second street.
Lentz, Alice B., 1897, B. Ph., Lloydsville.
Lentz, Theresa, 1893, B. Ph., Bellaire, teacher in High School.
Leonard, James Lincoln, 1893, LL. B. (B. S., Ohio Normal University), Welcome.
Levering, Orpheus D., 1893, M. E.
Lewis, Charles Montgomery, 1881, B. A., Columbus, with Columbus Evening Dispatch.
Lewis, Thomas K., 1894, B. Sc., Columbus, assistant in drawing State University.
Lincoln, Paul Martyn, 1892, M. E. in EE., Niagara, N. Y., assistant superintendent Niagara Falls Power Co.
Lindo, William C., 1896, C. E., Port Antonio, Jamaica, W. I., civil engineer.
Linebaugh, Jesse J., 1899, M. E. in EE., Schenectady, N. Y., General Electric Co.
Linson, Irvin, 1882, B. A.
Linville, Clarence P., 1900, B. Sc., Chemistry, Columbus, Fellow in Chemistry.
Lisle, Charles H., 1900, B. Ph., Pataskala.
Lisle, Dallas Gypsi, 1899, B. Ph., Ashland, Ky.
Lisle, Leslie Mae, 1899, B. Ph., Columbus.
Logan, Lavallette Lasea, 1896, E. M., Scranton, Pa., professor mine surveying, National Correspondence School.
Logsdon, Carey Lignori, 1899, B. Ph., Columbus.
Logsdon, Clement Jay, 1898, G. Ph., Newark, with Dr. J. H. Beatty.
Loomis, John Cooper, 1898, LL. B., Tiffin.
Lott, Charles Milford, 1895, M. E. in EE., Paulding, Supt. Electric Light Plant.
Loveberry, Clarence, 1896, D. V. M.
Lovejoy, Ellis, 1885, E. M., Union Furnace, chemist and superintendent Columbus Brick and Terra Cotta Co.
Lovejoy, Jesse R., 1884, B. Sc., Schenectady, N. Y., with General Electric Light Co.
Luce, George Ernest, 1897, LL. B. (A. B., Ohio Wesleyan University), Columbus, 95 Hamilton avenue.
Luse, Clara E., 1897, B. Ph., Mrs. Herbert Scott, Columbus.
Lusk, William Vinton, 1893, D. V. M., Ft. Wingate, New Mexico, veterinary surgeon, Ind. cavalry.
Lydenberg, Walter B., 1898, B. A., Dayton.
Lynas, Caroline, 1898, B. A., Columbus, 109 West Gay street.
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Lyon, Arthur H., 1900, M. E., Wauseon.

M

Maag, Benjamin Franklin, 1899, M. Sc. (B. Ph., Wooster University), Mt. Eaton.
MacGuire, Charles White, 1895, G. Ph., '97, M. D., Toledo Medical College, Toledo, Ohio.
Machwart, Washington J., B. Sc. (Muskingum College), 1900, M. A., Mt. Eaton.
Mackey, Ure LaVerne, 1893, M. E. in EE. (B. A., Wooster University).
Magly, Robert A., 1897, G. Ph., 1896, LL. M., chemist, Bessie Iron Furance, O.
Magruder, Leonard Anthony, 1895, B. Ph., 1896, LL. M.

Maier, John Valentine, 1895, LL. B. (B. S., Northern Indiana Normal University).
Malone, William Ruskin, 1885, B. A., Toledo, with New York Life Insurance Co.
Manecke, Gilbert, 1897, LL. B., Fostoria.
Manley, Rush Emmett, 1894, M. E. in EE., manager of Exchange Central Union Telephone Co., Mt. Vernon.
Mann, Wilber Edwin, 1899, B. Ph., 1900, M. A., Columbus.
Marple, Charles Allen, 1885, B. Sc., Louisville, Ky., teacher of Science, Male High School.
Marquard, Frank Fred, B. L., 1896, C. E., Sharon, Pa., chemist, National Co.
Marshall, George Sidney, 1894, B. Ph., 1897, LL. B., Columbus, attorney, Second Assistant Director of Law, 1566 Neil avenue.
Marshall, William B., 1900, M. E. in EE., Columbus.
Martell, Leonard Roland, 1898, B. A., Columbus, 1665 South High street.
Martin, Edwin Dunlevy, 1891, B. Ph., Lee Centre, Ill., teacher.
Martin, George, 1897, M. E. in EE., Massillon, Central Union Telephone Co.
Martin, Percy, 1892, M. E. in EE., Milan, Italy, Mediterranean Electric Co.
Marvin, Charles Frederick, 1883, M. E., Washington, D. C., U. S. Weather Bureau.
Mason, George F., 1890, G. Ph., Milwaukee, Wis., student of medicine, Milwaukee Medical College.
Masters, George Albert, 1886, C. E., Chicago, Ill., Western Library Association.
Mathers, John Harrison, 1895, B. Ph., Conover.
Mathias, Frederick W., 1893, B. Sc., Toledo, teacher High School.
Matson, George H., 1892, G. Ph., 169 Hamilton avenue, Columbus, professor of Pharmacy, Ohio Medical University.
Matson, William Edgar, 1896, M. E. in EE., Lynn, Mass., with General Electric Co.
Mauer, George Clifford, 1892, D. V. M., Oak Harbor, veterinarian.
Mays, James Wesley, 1897, B. Ph., Columbus, student in College of Law, State University.
McAllen, William Johnson, 1894, C. E., engineer, Chicago, Ill., Illinois Steel Co.
McCall, Arthur Gillett, 1900, B. Sc. (Agr.), McGaw.
McCallum, Raymond, 1900, B. Ph., Dayton.
McCarter, Edward Bancroft, 1892, B. A., 1894, LL. B., Columbus, attorney, 737 Bryden Road.
McCarter, Flora, 1897, B. A., Columbus.
McCarter, Robert Dale, Jr., 1895, M. E. in EE., London, England, representing General Electric Co.
McCleary, Clayton A. (Ph. B. Franklin College) 1900, LL. B., Lorain.
McClelland, Chalmer Kirk, 1898, B. Sc. (Agr.), Andover.
McClure, Robert E., 1900, LL. B., Dayton.
McCormick, J. H., 1880, M. E., Dayton, National Cash Register Co.
McCormick, William Francis, 1896, M. E., Columbus, Cleveland avenue.
McCulloch, George Elmer, 1891, B. Sc.
McDowell, John Andrew, 1882, B. Sc., 949 Neil avenue, Columbus, cement engineer.
McFadden, John Franklin, 1878, B. A., Columbus, attorney-at-law, 92 North Twenty-first street.
McGregor, James Howard, 1894, B. Sc., New York, assistant in Zoology, Columbia University.
McGrew, John Alexander, 1895, C. E., M. of W., Pennsylvania Railroad Co., Logansport, Ind.

McGuffey, Francis Hoyt, 1894, M. E. in EE., New Lexington, O., U. S. Telephone Co.
McIntire, Alfred Heber, 1898, M. E. in EE., 1900, M. E., Schenectady, N. Y., General Electric Co.
McLaughlin, Annis, 1897, B. Ph., Columbus.
McLaughlin, James Audley, 1895, LL. B. (B. A., Monmouth College).
*McMakin, Amasa Brown, 1879, B. Sc., died May 22, 1891.
McNary, George Bull, Jr., 1896, M. E. in EE., Toledo, with Bissel & Co.
McPherson, William, 1887, B. Sc., 1891, M. Sc., 1895, D. Sc., 1899, Ph. D., University of Chicago, Columbus, State University, professor of Chemistry.
Mead, Clinton V., 1884, B. Ph., Denver, Col., attorney-at-law.
Mead, Rollo Nooman, 1895, D. V. M., Grand Rapids.
Mebs, George H., 1897, G. Ph., Columbus, Pharmacist, Columbus State Hospital.
Meek, Charles Wesley, 1894, LL. B., Toledo.
Meek, Edward Duncan, 1896, B. A., 1899, M. A. Glencoe.
Meek, William W., 1899, B. Ph., 121 Fifteenth avenue, Columbus, J. W. Meek & Co.
Mendenhall, Maurice H., 1893, D. V. M., West Elkton.
Menough, Arthur George, 1894, E. M., Apartado 17, Zacatecas, Mexico, assayer and chemist
Mercer, Frank Emmet, 1896, M. E. in EE., Lima, Ohio.
Merrill, Alice Louise, 1893, B. A., 6565 Yale ave., Chicago, Ill., Station O, teacher.
Merrill, Charles Wesley, A. B. (Denison University), 1898, LL. B., 326-330 The Nasby, Toledo, attorney.
Mershon, Ralph D., 1890, M. E., New York office Westinghouse E. & M. Co.
Mesloh, Charles W., 1889, B. A., 1895, M. A., assistant professor of German, State University.
*Metters, Allen, 1896, B. A., died January 22, 1898.
Metzger, Edward H., 1897, G. Ph., Columbus, assistant pharmacist, State Epileptic Hospital.
Mickey, Blanche D., 1898, B. Ph., Shelby, teacher.
Middleswart, Clarence Coulter, A. B. (Marietta College), 1898, LL. B., Constitution.
Middleton, Ambrose, 1895, G. Ph., Malta, pharmacist.
Miller, Carl James, 1898, B. Sc. (Agr.), Franklin.
Miller, Charles C., 1883, B. A., Lima, superintendent schools.
Miller, Daniel Elmer, 1890, G. Ph., Dayton, druggist.
Miller, Frank Case, 1893, C. E., Dwight, Ill., Supervisor, Chicago and Alton R. R.
Miller, Gretchen P., 1900, B. Ph., Columbus.
Miller, Harry Franklin, 1889, M. E., South Bethlehem, Pa.
Miller, Henry P., 1897, D. V. M. Sunbury.
Miller, Merritt Finley, 1900, B. Sc. (Agr.) Ridpath.
Miller, Walter McNab, B. Sc., 1885, Reno, Nev., professor of Anatomy and Physiology, State University.
*Milligan, James Porter, 1886, B. A., died, February, 1899.
Mills, William C., 1898, B. Sc. (H. & F.), Columbus, curator Archæological collection, State University.
Milne, Alexander, B. D. (Yale University), 1898, M. A., Duluth, Minn., pastor Pilgrim Congregational Church.
Mix, Edward W., 1888, B. Sc., Paris, France, superintendent "Le Societi des Establishments."

Mix, Melvin Noble, 1895, B. Ph., New York, The World, journalist.
Mock, George Herbert, 1891, B. Sc., Ohio State Savings Bank, Columbus.
Montgomery, Howard, 1896, B. Ph.
Moodie, Alice Haynes, 1890, B. A., Mrs. Arthur Hartwell, Chicago, Ill.
Moon, Victor C., 1900, B. Ph., Columbus.
Mooney, Charles Napoleon, 1900, B. Sc. (Agr.) Milan.
Mooney, Daniel Francis, 1894, LL. B., St. Mary's.
Moore, Edgar Howard, 1900, B. Sc., Columbus.
Moore, Henry Curtis, 1897, B. Sc., Washington C. H.
Moore, Virgil Owen, 1895, B. Sc., M. D., Toledo, 710 Starr ave., physician.
Morhart, Katherine Elizabeth, 1893, B. Ph., Pomeroy.
Morrey, Annie Eliza, 1896, B. A., Chester Hill.
Morrey, Charles B., 1890, B. A., 1896, M. D., Columbus, assistant professor Physiology, State University.
Morrey, William T., 1888, B. A.
Morris, Ingle H., 1900, LL. B., Columbus.
Morris, Clyde T., 1898, C. E., Youngstown, Youngstown Bridge Co.
Morrison, M. Frank, 1879, B. A., Mrs. S. H. Short, London, England.
Morrison, Robt. O., 1893, C. E., assistant on engineer corps, Erie and Ashtabula division of Pennsylvania Lines west of Pittsburg.
Morrow, Charles James, 1900, D. V. M., Tiro.
Morton, George L., 1884, M. E. (LL. B., National Law School), chief examiner, patent office, Washington, D. C.
Moses, Martha Allston, 1891, B. Ph., 1111 Hinman ave., Evanston, Ill., bookkeeper.
Moss, Blanche, 1898, B. A., Columbus.
Moss, William, 1898, G. Ph., Cambridge, O., Pharmacist.
Moyer, Henry E., 1893, B. Sc., Youngstown, chemist, Youngstown Steel Co.
Mull, Bert LaForrest, 1898, LL. B., Columbus, 114 Herman street.
Mullay, Annie, 1887, B. Ph., Chicago, teacher.
Mundhenk, Fred., 1896, B. Ph., Columbus, life insurance agent, 233 North Eleventh avenue.
Mundhenk, Herbert C., 1889, B. Ph., Brookville.
Mundhenk, Ruth, 1899, B. Ph., Dayton.
Munn, Mortimer Adam, 1894, C. E., Cleveland, Cleveland & Eastern Ry. Co.
Munson, Theodore, 1898, B. Sc., Zanesville.
Murray, Claude R., 1895, B. A., Middleport, principal of High School.
Murray, Frank Erskine, 1892, D. V. M., Greenfield, veterinary surgeon.
Myers, Albert B., 1900, E. M., Columbus.
Myers, Joseph Simmons, 1887, B. A., Pittsburg, editor Pittsburg Post.
Myers, Ord, 1895, M. E. in EE., inspector Metropolitan St. Ry. Co., New York.
Myers, Roy V., 1893, C. E., Dayton, Tenn., Dayton Coal and Iron Co., Ltd.
Myers, Uriah H., 1887, E. M., Pittsburg, Pa., Myers, Shinkle & Co.

N

Nagel, William G., 1895, M. E. in EE., Toledo, W. G. Nagel & Co., electrical supplies.
Needham, Harry J., 1900, M. E., Columbus.
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Nettleton, Arthur Warren, 1898, B. Sc. (Agr.), Medina.
Newton, Henry S., 1889, B. Sc., Syracuse, N. Y., general manager Syracuse, Lakeside and Baldwinsville Ry.
Newton, Samuel Donald, 1895, C. E., engineer on Southern R. R., Knoxville, Tenn.

Nichol, Gertrude Belle, 1899, B. Ph., Columbus.
Nicholson, Charles M., 1900, M. E. in EE., Columbus.
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Niewvahner, John Henry, 1891, B. A., Jackson, assistant cashier, First National Bank.
Noble, W. F., 1879, B. A., Tiffin, attorney-at-law.
Nold, John H., 1900, E. M., Columbus.
Nurian, Kerson, 1899, M. E., Turtle Creek, Pa., Westinghouse E. & M. Co.
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O

Obetz, Francis Henry, 1896, G. Ph., '99, M. D., Starling Medical College, Columbus, physician.
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Odebrecht, August, 1895, G. Ph., Columbus, with H. Braun & Sons.
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O'Kane, Walter Collins, 1897, B. O., Troy, journalist.
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Orton, Edward Jr., 1894, E. M., Columbus, director of the department of Clay-working and Ceramics, State University.
Orton, Walter Edwin, 1899, LL. B., Williamstown, Mass.
Osborn, Abner A., 1900, B. Sc., Columbus.
Osborn, Samuel Galloway, 1897, LL. B., Columbus, attorney, 275 East State street.
Osborn, Raymond Carroll, 1898, B. Sc., 1900, M. Sc., Columbus.
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P

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Page, William Herbert, 1892, LL. B., 1894, LL. M. (B. A., Yale), Columbus, professor of Elementary Law, State University.
Palmer, Walter K., 1893, M. E., State University, Lawrence, Kan., associate professor, Department of Mechanical Engineering, University of Kansas.
Parker, John Bernard, 1898, B. A., 1900, M. A., Danville.
Parmenter, William W., 1900, B. A., Mt. Vernon.
Patch, Homer Austin, 1896, C. E., Minneapolis, Minn., Draftsman, Gillette-Herzog Manufacturing Co.
Patchell, Owen P., 1889, B. Ph., Paul's Valley, Indian Ter., attorney-at-law.
Patchin, Rufus Harry, 1898, LL. B., Chardon, attorney-at-law.
Payne, Halbert Edwin, 1887, M. E., 256 Broadway, New York City, American Typewriter Co.
Peal, Allen Saunders, 1895, B. A., Chicago, Ill.
Pearce, George Downer, 1892, G. Ph., Pharmacist, South Charleston.
Pearl, Allen Sexton, 1894, M. E. in EE., Columbus, O., representative of Central Electric Company.
Pease, Edward Livingstone, 1895, B. A., 1899, LL. B., Columbus, 30 Monroe avenue.
Pedlow, Edward Benjamin, 1893, C. E., New Straitsville, superintendent Columbus and Hocking Coal and Iron Co.

Peppel, Samuel Vernon, 1899, B. Sc. (Chem.), Madison, Wis., Wisconsin Geological Survey, assistant in Ceramics, State University, Columbus.
Pence, David Arrel 1894, M. E., Lowellville.
Perkins, Earl Harley, 1893, LL. B., Wellington.
Peters, William Lincoln, 1885, M. E., Riverside, Cal., merchant.
Pfarr, Philip Lewis, 1896, B. Sc. (Agr.), Dennison, Iowa.
Phelps, Cyrus Alba, 1892, B. Sc., Sombercto, Jacataccas, Mexico, with Sombereto Mining and Milling Co.
Pierce, John Mattison, 1895, M. E. in EE., South Charleston.
Pilcher, Hastings Moore, 1895, M. E. in EE., Athens, telegraph operator and billing clerk.
Pitts, Grace Lenore, 1900, B. Ph., Columbus, graduate student, State University.
Plantz, Wyatt Garfield, 1894, B. A., Pomeroy.
Pleukharp, Chas. V., 1885, M. E., Lacanada, California.
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Pomerene, Frank Etherington, 1891, B. Ph., 1895, LL. B., Coshocton, attorney–at–law.
Pool, Harwood Redington, 1881, B. Ph., LL. B., 62 Cedar street, New York City.
Porter, Mary Baxter, 1897, B. Ph.
Postle, Herman R., 1894, C. E., Joplin, Mo., civil engineer.
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Powell, Chas. S., 1893, M. E. in EE., Cleveland, representing Westinghouse E. & M. Co.
Powell, Edward Thompson, 1896, LL. B., Columbus, attorney, 518 East Broad street.
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Prall, Anna Dickson, 1898, B. A., Columbus.
Pratt, Fred K., 1900, C. E., New Philadelphia.
Price, Homer Charles, 1897, B. Sc. (Agr.), assistant horticulturist, O. S. U.
Priest, Frederick, 1895, D. V. M., Newark, veterinary surgeon.
Pryor, Charles Foster, 1898, LL. B., Columbus.
Pugh, Lawrence Randolph Whetzel, 1893, B. Ph., 1895, LL. B., Columbus, attorney–at– law, 13 Board of Trade.
Pulling, Margaret G., 1900, B. Ph., Columbus.
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R

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Rarick, Murray M., 1896, B. Sc. (Agr.), Jacksontown, physician.
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Rawson, Levi, 1899, C. E., Sistersville, W. Va., Carter Oil Co.
Ray, Frank A., 1887, E. M., Columbus, professor of mine engineering, State University.

Ray, William M., 1893, C. E., room 825, Hickox Building, Cleveland, C. L. & W. R. R.
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Reed, William Allen, 1897, E. M., Querida, Colorado, assayer and surveyor, Bassick G. M. Co.
Reese, William Daniel, 1891, B. A.
Reese, William Henry, 1896, G. Ph., Glen Roy, Pharmacist.
Reeves, Archibald C., 1887, C. E., 153 Superior avenue, Dayton, civil engineer.
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Rice, Herbert A., 1897, C. E., Jackson, teacher.
Rice, Mabel Elise, 1898, B. A., Columbus, student, Hubbard avenue.
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Richardson, Hamilton Hutchinson, 1892, B. Agr., Brooklyn, gardner.
Richardson, William Waddle, 1899, B. Ph., Washington, D. C.
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Rietz, Henry Lewis, 1899, B. Ph., Gilmore.
Riggs, Ernest Jacob, 1895, B. Sc. (Agr.), M. Sc. (H. & F.), Raccoon Island, O.
Rightmire, George Washington, 1895, B. Ph., 1898, M. A., Columbus, teacher in High School and fellow and assistant in American History, State University.
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Roach, Simeon Andrew, 1899, B. Ph., Cleveland, New York Life Insurance Co.
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Roberts, Cyrus Swan, 1898, E. M., San Lui Potosi, Mexico, with the Cia Metaturica Mexicana.
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Robinson, Erdis Geroska, 1893, C. E., Mexico, D. F., Mexico, Engineering Department of Mexican Central Railway.
Robinson, Zella Vina, 1898, B. Ph., 1900, M. A., Columbus, Highland street.
Rockwell, Mary Fannie, 1899, B. Ph., Columbus.
Roebuck, Carl Fletcher, 1900, B. Ph., Columbus, student State University Law College.
Rogers, Andrews, 1896, B. Ph., New York City, student, College of Physicians and Surgeons.
Rogers, Frank Persons, 1899, B. A., Columbus, 140 Warren street.
Rogers, James Bertrand, 1896, E. M., Steubenville, National Steel Co., Mingo Junction.
Root, Willis J., 1885, E. M., Columbus, chemist, National Steel Co.
Rowlee, Henry A., 1897, M. E., Columbus, inspector Ordnance Department U. S. A., The Rarig Eng. Co.

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Rule, Ralph R., 1897, LL. B. (B. S., Tri-State College, Ind.), Greenspring.
Ruppersburg, Emma Anna, 1891, B. Sc., 1896, M. Sc., Columbus, teacher in High School, 842 South High street
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S

Sabine, Annie Ware, 1884, B. A., 1886, A. M., (1888, B. Sc., Mass. Institute Technology), (Mrs. W. H. Siebert), Columbus
Sabine, Wallace Clement, 1886, B. A. (M. A., Harvard), 53 Trowbridge street, Cambridge, Mass., assistant professor in Physics, Harvard University.
Safford, Robert Edwin, 1894, B. Sc., New York City, Mexican Metallurgico Co.
Sandoe, Lydora Olivia, 1893, LL. B., Mrs. Bachman, 1425 Bryden Road, Columbus.
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Sayre, Charles B., 1900, B. A., Columbus.
Schaff, Mae B., 1900, B. Ph., Columbus.
Schaub, Edward Louis Tascher, 1885, M. E., Columbus, assistant superintendent Associated Charities.
Schaub, Charles E., 1897, E. M., Phillippi, W. Va.
Scheibell, William O., 1888, E. M., Columbus, secretary and general manager, The American Art Tile Co.
Schlesinger, Hugo Nathan, 1899, LL. B., Xenia.
Schreiber, George E., 1900, M. E. in EE., Ironton.
Schreiber, John Martin, 1899, M. E. in EE., Cleveland, Cleveland Electric Street Railway.
Schroll, Otto, 1886, C. E., Wheeling, W. Va., civil engineer, M. of W., W. B. & T. Ry. Co.
Schueller, Erwin Waldemar, 1892, B. A., M. D., 1894, Columbus, physician, 439 South High street.
Schwier, Minona, 1897, B. A., Columbus, 212 East Mound street.
Scott, Anna Neill, 1886, B. A., 1274 Summit street, Columbus.
Scott, Bertha, 1890, B. Ph., Indianola Place, Columbus.
Scott, Herbert, 1893, B. Sc., Columbus, pastor North M. E. Church, 2533 East avenue.
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Scott, Daisy Medill, 1887, B. A., Columbus, teacher in High School.
Scott, Dudley, 1900, B. Ph., Columbus.
Scott, Emma, 1888, B. Sc., Brindiban, India Missionary.
Scott, Ernest, 1897, B. Sc. (Agr.), Columbus, student, Ohio Medical University, 131 East Fifteenth avenue.
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Scott, Mary Mermon, 1887, B. A., 1274 Summit street, Columbus.
Scott, Mary Bole, 1896, B. A., Columbus, teacher, 926 Oak street.
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Sedgwick, Edward Crayton, 1895, M. E. in EE., Columbus, Case Mfg. Co.

Selby, Augustine D., 1893, B. Sc., Wooster, botanist and chemist, Ohio Experiment Station.
Sellenings, Albert Eugene, 1896, B. Ph., M. D., Bellevue Interne, New York.
Seney, Allen J. (B. Ph., University of Michigan), 1899, LL. B., North Baltimore.
Serva, Adam A., 1893, M. E. in EE., Ft. Wayne, Ind., Fort Wayne Electric Works.
Seymour, Raymond J., 1900, B. Sc., Fellow in Natural History, Tuft's College.
Shark, Robert J., 1897, LL. B., Hamilton.
Sharp, Charles C., 1888, C. E., Corning, superintendent Mining Department Sunday Creek Coal Co.
Sharp, David Barton, 1893, LL. B., Columbus, 335 West Fourth avenue.
Shellabarger, Marley Rolin, 1897, B. Sc. (Agr.), Garland, Ohio.
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Shepherd, Charles W., 1900, C. E., Huron.
Sherman, Christopher Elias, 1894, C. E., Columbus, assistant professor in Civil Engineering, State University.
Shield, Wallace B., 1898, B. A., Kansas City, Mo., Manual Training High School.
Short, Sidney H., 1880, B. Sc., London, England.
Shuck, Carey Lucas, 1898, B. Ph., Columbus, "Columbus Evening Dispatch."
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Siebert, Wilbur H., 1888, B. A. (M. A., Harvard), Columbus, associate professor History, State University.
Sigerfoos, Charles Peter, 1889, B. Sc., 1897, Ph. D. (Johns Hopkins University), Minneapolis, Minn., professor of Zoology, University of Minnesota.
Sigerfoos, Edward, 1891, B. Ph., Fort Sheridan, 1st Lieut. Fifth Infantry, U. S. Army.
Simonton, Mark, 1895, M. E. in EE., Columbus, Electric Supply and Construction Co.
Simpson, Abigail Ellen, 1895, B. A., London, teacher in High School.
Singleton, Charles Tod, 1900, B. Ph., student State University Law College.
Sinks, Frederick Nicholas, Ph. L. (Yale University), 1898, LL. B., Columbus, 714 East Broad street.
Skinner, Chas. E., 1890, M. E., box 435, Pittsburg, Pa., Westinghouse E. & M. Co.
Slater, Burr Homer, 1895, G. Ph., Chesterville, Pharmacist.
Slyh, Emma Almeida, 1892, B. Sc., Marble Cliff.
Smith, Albertine, 1900, B. Ph., Columbus.
Smith, Alice May, 1897, B. Ph.
Smith, Burton Griffin, 1895, G. Ph., Detroit, Mich., chemist for the Ray Chemical Co.
Smith, Carl Clyde, 1890, B. Ph., Marietta.
Smith, Clarence Elmer, 1898, G. Ph., Columbus, student O. M. U.
Smith, David William, 1899, C. E., Columbus, Hocking Valley Ry. Co.
Smith, Edward E., 1897, G. Ph., Indian Territory.
Smith, Edward Trevett, 1898, LL. B., Holden, Mo.
Smith, Florizel, 1880, B. A., Spahr Building, Columbus, attorney-at-law, 970 Bryden Road.
Smith, Horace Prescott, 1886, B. Sc.
Smith, Maud Virginia, 1894, B. A. (Mrs. Thomas Chalmers), Port Huron, Mich.
Smith, Myron Alphonso, 1892, B. Ph., Columbus, with Keyes & Thomas, real estate agents.
Smith, Nathaniel B., 1893, D. V. M.
Smith, Philo Christopher, 1885, B. Sc., Middlebranch, farmer.
Smith, Virginia Roletta, 1900, B. Ph., Columbus.

Smith, Warren Lee, 1899, LL. B., Columbus, 29 East Dodridge street.
Snider, Charles M., 1897, B. Sc. (Ind. Arts), Columbus, 162 West Mound St.
Snider, Jesse Worthington, 1893, LL. B., LL. M., Columbus, 340 Denmead ave.
Snively, Harry H., 1895, B. A., Columbus, teacher in High School, 1332 Highland street.
Snow, Walter A., 1897, B. Ph., Park Place, Minneapolis, Minn., Pastor Congregational Church.
*Snyder, Henry, 1879, B. Sc., 1892, M. Sc. Died September, 1898.
Snyder, James Edward, 1892, LL. B. (B. A., Wooster University).
Snyder, Walter S., 1897, LL. B., Columbus, Attorney, 69 North Fourth street.
Somermeir, Edward Everett, 1898, G. Ph., Columbus, assistant in Mining and Metallurgy, State University.
Southard, Eustace Elden, 1895, G. Ph., Columbus, pharmacist, 470 Oak street.
Southard, Thomas Campbell, 1896, B. A., Columbus, 470 Oak street.
Sparks, Edwin Earle, 1884, B. A., 1892, M. A., Chicago University, assistant professor, Chicago, Ill.
Spencer, William Henry, 1891, G. Ph., Sandusky, with Strong and Spencer.
Spencer, Ralph Oliver, 1899, B. A., Columbus.
Sperr, Frederick W., 1883, E. M., Houghton, Mich., professor of Civil and Mining Engineering, Michigan School of Mines.
Sprague, Charles Franklin, 1896, B. A., 1899, LL. B., Wapakoneta.
Sprague, Clarence Milton, 1899, C. E., Columbus, Room 2, Union Station, Assistant on Engineers' Corps, P., C., C. & St. L., Indianapolis Div.
Sprague, William Ralph, 1899, B. Ph., Columbus, 71 West Tenth avenue
Spurrier, John Randolph, 1896, M. E. in EE., Wilkinsburg, Pa., Westinghouse E. & M. Co.
Staley, Marcellus, 1899, M. E. in EE., U. S. Transport Meade, chief electrician.
Stanberry, Charles L., 1892, G. Ph., Pharmacist, McConnellsville.
Starbuck, Daniel Carl, 1899, M. E. in EE., Care U. S. Despatch Agent, N. Y., U. S. S. Chicago.
Steeb, Carl Eckert, 1899, B. Ph., Columbus, accountant, O. S. U.
Stephenson, Henry Thew, 1894, B. Sc., Bloomington, Ind., instructor in English, University of Indiana.
Stevens, Frank M., 1897, LL. B., Elyria.
Stevenson, Amos Claude (A. B., Oberlin College), 1900, LL. B., Fostoria.
Steward, Charles Benjamin, 1900, B. Sc. (Agr.), Marcy.
Stewart, Edwin Earle, 1895, LL. B. (M. A., Antioch College), attorney, Springfield.
Stewart, Lee Raymond, 1896, C. E., Philadelphia, Pa., N. Y. Ship Building Co.
Stewart, Harford Toland, 1896, M. E. in EE., Agent General Electric Co., Columbus.
Stiger, Thomas A., 1899, LL. B., Bucyrus.
Stimson, Charles Leslie, 1899, B. A., Columbus, 737 Bryden Road.
Stimson, George, 1900, B. A., Columbus, 737 Bryden Road.
Stinebaugh, Isaac Long, 1892, C. E., Port Clinton, deputy to county surveyor
Stone, Carlton Elijah, 1899, C. E., Gallipolis, civil engineer.
Storer, Norman Wilson, 1891, M. E. in EE., Pittsburg, Pa., Westinghouse E. & M. Co.
Storer, Simon B., 1893, M. E. in EE., Syracuse, N. Y., engineering and salesman, Westinghouse E. & M. Co.
Stouffer, Charles Irwin, 1893, LL. B., Columbus, 387 Oak street.
Stoughton, George L., 1895, LL. B. (B. A., Otterbein University).
Stull, Emmett Willet, 1894, M. E. in EE., Johnstown, Pa., draughtsman Motor Department The Lorain Steel Co.

Stump, Franklin Pierce, 1892, B. Agr., Convoy, farmer.
Stump, John William, 1895, C. E., county engineer, Fairfield, Co., Ohio.
Stump, William Lisle, 1897, G. Ph., 1898, M. Ph., Columbus, Pharmacist.
Surface, Harvey Adam, 1891, B. Sc., 1892, M. Sc.
Sutherland, Margaret, 1898, B. Ph., (Mrs. Benj. Flynn), Columbus, Neil ave.
Sutphen, James Leonard, 1897, G. Ph., Columbus, 673 Livingston avenue.
*Swartzel, Earl Glenn, 1895, B. Sc., died March, 1899.
Swartzel, Karl Dale, 1893, B. Sc., 1894, M. Sc., Columbus, assistant professor of Mathematics, State University.
Swisher, William Henry, 1896, G. Ph., M. D., Eaton, Physician.
Sykes, William Edgar, 1898, LL. B., Marietta.
Sylvester, John E., Jr., 1898, B. Ph., Wellston, editor "Wellston Telegram."

T

Talbot, Ellen B., 1890, B. A., Troy, N. Y.
Talbot, Herbert Swan, 1898, B. Ph., Columbus, clerk Columbus Board of Trade, 640 Franklin avenue.
Talbot, Mignon, 1892, B. A., 640 Franklin ave., Columbus, teacher in High School.
Travis, Fred Lant, 1900, B. A., Pana, Ill., teacher.
Travis, John F., 1900, B. A., Columbus, Fellow in Mathematics, Ohio State University.
Taylor, Arthur W., 1894, E. M., Cleveland, chemist for Otis Steel Co., Ltd.
*Taylor, Francis Asbury, 1885, B. A., died July 25, 1891.
Taylor, Alexander R., 1895, B. Sc.
Taylor, Fredric Wellington, 1900, B. Sc. (Agr.), Wooster.
Taylor, Ralph Buren, 1895, B. A.
Taylor, Joseph Russell, 1887, B. A., M. A. (Columbia University), Columbus, assistant professor English Literature, State University.
Taylor, Pearl V., 1897, B. A., Columbus, 46 West Noble.
Teter, Anstie Welsh, 1896, G. Ph., Bainbridge, Pharmacist.
Thomas, James O., 1897, C. E., Columbus, 404 West Goodale.
Thomas, Lawrence David, 1900, B. Ph., Lancaster.
Thompson, Carmi A., B. Ph., 1895, LL. B., Ironton, city solicitor.
Thompson, Howard N., 1888, B. Ph., Washington, D. C., correspondent Associated Press.
Tomlinson, James Rowe, 1892, C. E., Cleveland, Forest City Iron Works.
Towne, Robert S., 1879, B. Sc., E. M., New York, N. Y., president Mexican Northern Railway.
Townshend, Alice Margaret, 1880, B. A. (Mrs. Charles Wing), Columbus.
Townshend, Arthur Bailey, 1878, B. Sc., M. D., 22 West 32d street, New York, New York, N. Y., physician.
Tufts, Charles Hill, 1899, E. M., Cleveland, assistant chemist Otis Steel Co., Ltd.
Tupper, Eugene L., 1893, G. Ph., Ottawa, physician.
Turner, Arthur M., 1893, M. E. in EE., 281 Oak street, Chicago, Ill.
Turner, Frederick Lewis, 1897, B. A., 1898, M. A., Oak Park Hills, teacher in High School.
Twiss, George R., 1885, B. Sc., Cleveland, teacher of Physics in High School.
Twiss, Edith Minot, 1895, B. A., Mt. Vernon, teacher in High School
Twiss, Marion Evans, 1897, B. A., Columbus, State Library.
Tyler, Frederic Jared, 1900, B. Sc. (H. & F.), Perry.

U

Uncles, Margaret Anna, 1897, B. A., Columbus, Gill street.
Underwood, Ella, 1898, B. A., Mrs. O. A. Davis, Alliance.
Urban, Harry Marshall, 1898, C. E., Pittsburg, Pa., "Pan Handle" R. R., assistant engineer corps.

V

Vance, Mary Grace, 1898, B. A., Danville, Ky., Caldwell College.
Vandervoort, William P., 1886, E. M., Morrow, superintendent of schools.
Van Harlingen, Edward M., B. Sc., 1883, M. Sc., 1897, Columbus.
Viets, Willis B., 1886, E. M., Parryville, Pa., chemist, Carbon Coal and Iron Co.
Voke, Lewis F., 1893, G. Ph., Columbus, M. D., Starling Medical College, physician, France Medical Institute.
Voorhees, Burt Fisk, 1894, LL. B., Coshocton.
*Voorhees, Charles W., 1892, LL. M. (B. Sc., Scio College), died 1898.
Voorhees, Isaac M., 1894, B. Ph., Cadiz, journalist, editor of "Harrison News."
Vornholt, Julius Franklin, 1898, B. A., New Bremen.
Vosskuehler, Joseph H., 1900, M. E., Dayton.

W

Wadsworth, F. L. Olcutt, 1888, B. Sc., E. M., M. E., Director of Allegheny Observatory, Allegheny, Pa.
Wagstaff, Edward A., 1893, G. Ph., Niles, pharmacist, Jones and Wagstaff.
Waid, Clarence William, 1898, B. Sc. (H. & F.), Durham, N. H., Assistant in Horticulture.
Walker, Frederick William, 1896, B. A., Columbus, 46 North Lazelle St.
Walker, James Madison, 1896, C. E., Chicago Junction, Assistant Res. Eng. B. & O. R. R. Co.
Walsh, Annetta Curtis, 1897, B. A., Columbus, 148 Buttles avenue.
Walsh, Mary Helen, 1896, B. Ph., Columbus, 148 Buttles avenue.
Ward, J. C., 1880, B. A., Painesville, engineer and surveyor.
Ward, Philip Emerson, 1899, B. Ph., Willoughby.
Warden, Leonard C., 1899, B. Sc. (H. & F.), 42 Jackson Boulevard, Atlantic Building, Chicago, Ill.
Warner, Cora, 1882, B. Ph., corner Hubbard and Dennison aves., Columbus.
Warren, Arthur Robert, 1893, LL. B., Columbus.
Warren, Grant Alexander, 1894, LL. B.
Watson, Bensen Gruber, 1896, B. Ph., Columbus, attorney, The Garland.
Watson, Edward T., 1897, B. Sc., Chillicothe, teacher in High School.
Watt, Sern P., 1886, M. E., Chicago, Ill., Vice President and Mechanical Expert, Hine-Watt Mfg. Co.
Weaver, Mary Luretta, 1891, B. Ph., 231 Church street, Urbana.
Weaver, Harry Bright, 1894, LL. B. (B. A., Ohio Wesleyan University), Circleville, attorney.
Webb, Scott Anderson, 1888, B. Ph., Columbus, attorney-at-law, 222 King avenue.
Webber, Karl T., 1897, LL. B., Columbus, attorney, 2585 West Broad.
Weick, Charles William, 1898, B. Sc. (Ind. Arts), New York, Professor Manual Training, Columbia University.
Weidner, George F., 1887, G. Ph., Columbus, Kauffman-Latimer Co.
Weinland, Edgar Lynn, 1893, LL. B. (B. Ph., Otterbein University), Columbus, attorney, 1256 Neil avenue.
Weisman, Laura A., B. Sc. (Dom. Sci.), Columbus.

Welch, Clark J., 1888, C. E., Pittsburg, Pa., assistant engineer, Keystone Bridge Works.
Welch, Oliver Bartlet, 1895, M. E. in EE., Dennison, electrician, United Electric Co.
Weld, Harry P., 1900, B. Ph., Marysville.
Wendt, William Carl, 1889, G. Ph., 901 South High street, Columbus, Heer's Pharmacy.
Wertz, Edwin Slusser, 1899, B. Ph., 1900, LL. B., Dalton.
West, Earle Downs, 1900, B. A., Columbus.
Whitacre, Horace J., 1891, B. Sc., 1895, M. D., Columbia University, Cincinnati (Mt. Auburn), physician.
Whitacre, Marion, 1894, B. Sc., 1899, M. D., Columbia University, Cincinnati, physician.
White, David S., 1890, D. V. M., Columbus, professor in Veterinary Medicine, State University.
Wiggins, Sherman Tecumseh, 1894, LL. M. (LL. B., University of Michigan), 1897, B. Ph., Coffeyville, Kan.
Wikoff, John Burkett, 1884, B. Ph., Cambridge, assistant to general manager Cleveland & Marietta Railway Co.
Wilcox, Alvah Newton, 1895, M. E., Dayton.
Wilcox, Edwin Mead, 1896, B. Sc., Harvard University.
Wilcox, McAllister, 1898, LL. B., Sunbury.
Wildermuth, Andrew Lee Roy, 1899, LL. B., Columbus.
Wilgus, Horace Lafayette, 1882, B. Sc., 1884, M. Sc., Ann Arbor, Mich., professor of Law, University of Michigan.
Wilgus, James A., 1888, B. Ph., M. A., Plattville, Wis., professor of History and Economics in the State Normal School.
Williams, Anna Ernestine, 1899, B. Ph., Jackson, teacher in High School.
Williams, Clara M., 1900, B. Ph., Columbus.
Williams, Herbert Oswald, 1894, B. A., 1900, M. A., Columbus, teacher in High School, 190 East Long street.
Williams, Guy Rulon, 1895, LL. B., Columbus, attorney-at-law.
Williams, Lloyd Thomas, 1896, B. Ph., 1900, LL. B., Toledo, attorney.
Williamson, Edward Bruce, 1898, B. Sc., Bluffton, Ind.
Wilson, Harry Rush, 1895, LL. B. (B. A., Mt. Union College), 1896, LL. M., Columbus, attorney, 1459 Bryden Road.
Wilson, Frank (B. S., Scio College), 1900, LL. B., Jolly.
Winter, Nevin Otto, 1897, LL. B. (A. B., Ohio Wesleyan University), Spitzer Bldg., Toledo.
Wirth, Ida M., 1895, B. Ph., Columbus, South High street.
Wirthwein, Louis Philip, 1899, C. E., Columbus, 677 South High street.
Wise, Albert Joseph, 1898, C. E., Anderson, Ind., assistant engineer, Big Four. Cleveland and Indianapolis Div.
Wolcott, Roy C., 1895, B. Ph., 1896, M. D., Columbus, physician.
Wolf, Herman Howard, 1895, C. E., Lieut. U. S. Revenue Cutter Service.
Wood, Francis Carter, 1891, B. Sc., 8 East 49th street, New York City, Pathologist to St. Luke Hospital.
Wood, Kenneth Dodge, 1881, B. A., Columbus, secretary of the Central Ohio Paper Company.
Wood, Willard B., 1893, B. Sc., Columbus, in Columbus Postoffice.
Woods, Charles H., 1900, LL. B., Chillicothe.
Woodworth, Henry Julian, 1887, B. Sc., Logan.
Worcester, Wood Frank, 1899, B. Ph., Columbus, O. S. U. Dormitory.
Workman, Charles, 1896, B. A., Columbus, 135 East Eighth avenue.

Wright, Burr Roscoe, 1897, B. Ph., Columbus, 765 North Park street.
Wright, Carrie, 1892, B. Ph., Chicago, Ill., teacher in the Armour Institute.
Wright, William Van Horn, 1893, LL. B., 1896, LL. M., Columbus Postoffice.

Y

Yockey, Paul B., 1897, B. A., 1900, LL. B., Columbus, 404 West Seventh ave.
Yohe, Cyrus Elmer, 1893, LL. B., Nevada.
Young, Harry Nelson, 1895, G. Ph., Flint, Michigan, Pharmacist.
Young, John Wesley, 1899, B. Ph., Ithaca, N. Y., Fellow in Mathematics, Cornell University.
Young, Mary Grace, 1900, B. Ph., Mt. Vernon.

Z

Zaumseil, Oscar C., 1887, Webb City, Mo.
Zurfluh, William Nicholas, 1894, M. E. in EE., Springfield, The Robbins and Myers Company.

University Bulletins Series 5, Number 2

OHIO STATE UNIVERSITY

THIRTIETH ANNUAL REPORT

OF THE

BOARD OF TRUSTEES

TO THE

GOVERNOR OF OHIO

FOR THE

Year Ending June 30, 1900.

PART II.

The State has no material resources at all comparable with its citizens, and no hope of perpetuity except in the intelligence and integrity of its people.

COLUMBUS
PUBLISHED BY THE UNIVERSITY
JUNE, 1900.

Entered at the Postoffice at Columbus, Ohio, as Second-Class Matter.

University Bulletins Series 5, Number 2

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CALENDAR

1900

JULY

S	M	T	W	T	F	S
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AUGUST

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OCTOBER

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1901

JANUARY

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APRIL

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MAY

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JUNE

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23,30	24	25	26	27	28	29

DAYS AND DATES

1900

Entrance Examinations (8 A. M.)	Monday,	September	17.
Registration Day	Tuesday,	September	18.
Lectures and Class-work begin (all Colleges)	Wednesday,	September	19.
Annual Address by the President (11 A. M.)	Friday,	September	21.
Meeting of Trustees	Wednesday,	September	26.
Thanksgiving Recess	Thursday,	November	29.
	Friday,	November	30.
Latest date for announcing Subjects of Theses	Saturday,	December	15.
First Term ends	Wednesday,	December	19.

Christmas Vacation.

1901

Second Term begins—Registration Day	Wednesday,	January	2.
First Semester (College of Arts, Philosophy and Science, and College of Law) ends	Friday,	February	8.
Second Semester (College of Arts, Philosophy and Science, and College of Law) begins—Registration Day	Monday,	February	11.
University Day	Friday,	February	22.
Second Term ends	Friday,	March	29.
Spring Recess—From 4 o'clock P. M.	Friday,	March	29.
to 8 o'clock A. M.	Wednesday,	April	3.
Third Term begins—Registration Day	Wednesday,	April	3.
Meeting of Trustees	Wednesday,	April	3.
High School Day	Friday,	May	17.
Field Day—Athletic Association	Saturday,	May	18.
Senior Vacation begins	Saturday,	May	25.
Competitive Drill—Cadet Battalion	Saturday,	May	25.
Memorial Day	Thursday,	May	30.
Final Examinations (all Colleges)	Monday, to Friday,	June	10. 14.
Baccalaureate Sermon	Sunday,	June	16.
Entrance Examinations (8 A. M.)	Monday,	June	17.
	Tuesday,	June	18.
Class Day	Monday,	June	17.
Meeting of Trustees	Tuesday,	June	18.
Alumni Day	Tuesday,	June	18.
COMMENCEMENT	Wednesday,	June	19.

Summer Vacation.

Entrance Examinations (8 A. M.)	Monday,	September	16.
Registration Day	Tuesday,	September	17.
Lectures and Class-work begin (all Colleges)	Wednesday,	September	18.
Annual Address by the President (11 A. M.)	Friday,	September	20.
Meeting of Trustees	Wednesday,	September	25.

BOARD OF TRUSTEES

1899-1900

		Term Expires.
JOHN T. MACK	Sandusky	May 13, 1901.
LUCIUS B. WING	Newark	" 1902.
THOMAS J. GODFREY	Celina	" 1903.
J. McLAIN SMITH	Dayton	" 1904.
PAUL JONES	Columbus	" 1905.
OSCAR T. CORSON	Columbus	" 1906.
DAVID M. MASSIE	Chillicothe	" 1907.

OFFICERS OF THE BOARD

J. McLAIN SMITH	President.
OSCAR T. CORSON	Vice President.
ALEXIS COPE	Secretary.
LOUIS F. KIESEWETTER	Treasurer.

COMMITTEES OF THE BOARD

EXECUTIVE	FARM	FINANCE
L. B. WING	J. McLAIN SMITH	D. M. MASSIE
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PAUL JONES	JOHN T. MACK	PAUL JONES

FACULTY AND COURSES OF STUDY

THOMAS J. GODFREY OSCAR T. CORSON JOHN T. MACK

THE FACULTIES

Members of the Faculties, and Other Instructors

1899-1900

WILLIAM OXLEY THOMPSON.....University Grounds

President

A. B., Muskingum College, 1878; A. M., ibid., 1881; D. D., ibid., 1891; LL. D., Western University of Pennsylvania, 1897. Licensed by the Presbytery of Zanesville, Dresden, Ohio, April, 1881; Ordained by Presbytery of Fort Dodge, Iowa, July, 1882; Pastor Odebolt, Iowa, 1882–85; Pastor Longmont, Colorado, 1885–91; President Longmont College, 1885–89; President Miami University, 1891–99; present position since 1899.

*EDWARD ORTON.....100 Twentieth street

Professor of Geology, and State Geologist

A. B., Hamilton, 1848; Ph. D., Hamilton, 1875; LL. D., Ohio State University, 1881. Student of Theology, Lane Seminary, 1849; Student at Lawrence Scientific School, Harvard University, 1852; Student, Andover, 1854; Professor of Natural Science, State Normal School, Albany, N. Y., 1856–'59; Principal, Chester Academy, N. Y., 1859–'65; Professor of Natural History, Antioch, 1865–'72; President of Antioch, 1872–'73; President of the Ohio State University, 1873–'81; State Geologist, 1869; present position since 1881.

WILLIAM HENRY SCOTT.....131 Fifteenth avenue

Professor of Philosophy

A. B., Ohio University, 1862; M. A., Ohio University, 1865; LL. D., Ohio University and Ohio Wesleyan, 1884. Superintendent of Public Schools, Athens, Ohio, 1862–'64; Principal of the Preparatory Department of Ohio University, 1864–'65; Pastor of Main Street (now Trinity) M. E. Church, Chillicothe, Ohio, 1865–'67; Pastor of Town Street (now First) M. E. Church, Columbus, Ohio, 1867–'69; Professor of Greek, Ohio University, 1869–'72; President and Professor of Philosophy, Ohio University, 1872–'83; President and Professor of Philosophy, Ohio State University, 1883–'95; present position since 1895.

SIDNEY AUGUSTUS NORTON.....363 East Town street

Emeritus Professor of Chemistry

A. B., Union, 1856; A .M., Union, 1859; M. D., Miami Medical College, 1867; Ph. D., Kenyon, 1878; LL. D., Wooster, 1881. LL. D., Union, 1899. Student at Bonn, Leipsic, Heidelberg; Teacher, Poughkeepsie Collegiate Academy, 1856; Tutor, Union, 1857; Principal Hamilton (Ohio) High School, 1858; Instructor of Natural Science, Cleveland High Schools, 1859–'66; Teacher of Natural Science, Mt. Auburn, 1866–'72; Professor of Chemistry, Miami, 1867–'72; Acting Professor of Physics, Union, 1872–'73; Professor of Chemistry, Ohio State University, 1873–'95; Lecturer in Chemistry, 1895–'99; Present position since 1899.

STILLMAN W. ROBINSON.....1353 Highland street

Emeritus Professor of Mechanical Engineering

C. E., University of Michigan, 1863; D. Sc., Ohio State University, 1896; Assistant Engineer U. S. Lake Survey, 1863–'66; Instructor in Engineering, University of Michigan, 1866–'67; Assistant Professor Mining Engineering and Geology, University of Michigan, 1867–70; Professor Mechanical Engineering and Physics, University of Illinois, 1870–'78; Professor Mechanical Engineering and Physics, Ohio State University, 1878–'81; Professor Mechanical Engineering, Ohio State University, 1881–'95. Resigned in 1895. Consulting Mechanical Engineer and Inventor for Wire Grip and McKay Shoe Machinery Companies, 1884–'98; Re-elected Emeritus Professor of Mechanical Engineering, Ohio State University, 1899. State Inspector of Railroads and Bridges, 1880-84. Consulting Engineer Santa Fe R. R., 1887–'90, Consulting Engineer Lick Telescope and Mountings, 1887.

*Died, October 16, 1899.

NATHANIEL WRIGHT LORD.....338 West Eighth avenue

Professor of Mineralogy and Metallurgy, Director of the School of Mines, and Dean of the College of Engineering

E. M., Columbia, 1876; Assistant Engineer, Cincinnati, 1877; Engineer and Metallurgist Monte Grande Gold Mining Co, Nicaragua, 1878; Assistant School of Mines, O. S. U., 1879; Chemist Ohio Geological Survey, 1880–'88; Assistant Professor of Mining and Metallurgy, O. S. U., 1880–'87; Professor Mining and Metallurgy, O. S. U., 1887–'91; Professor Metallurgy and Mineralogy, O. S. U., 1896; Chemist State Board of Agriculture, 1881–'99; Chemist State Board of Health, 1896–'98; present position since 1896.

SAMUEL CARROLL DERBY.....93 Fifteenth avenue

Professor of Latin

A. B., Harvard, 1866; A. M., Harvard, 1869 (in course), 1877 (by examination). Principal of Schools, Ilion, N. Y., 1866–'67; Assistant in Dixwell's Classical School, Boston, 1867–'70; Professor of Language, Antioch, 1870–'81; President, Antioch, 1877–'81; Student, Latin and History, Harvard, 1876–'77; Student, Latin and History, Johns Hopkins, 1880–'81; Student, Latin, Harvard, 1892–'93; present position since 1881.

WILLIAM RANE LAZENBY.....348 West Eighth avenue

Professor of Horticulture and Forestry

B. Agr., Cornell, 1874; M. Agr., Iowa Agricultural College, 1887. Instructor Horticulture and Botany, Cornell, 1874–'77; Assistant Professor of Horticulture, Cornell, 1877–'81; Lecturer, N. Y. State Grange, 1874–'81; Director Ohio U. S. Experiment Station, 1882–'87; Professor of Botany and Horticulture, Ohio State University, 1881–'92; present position since 1892.

JOSIAH RENICK SMITH.....950 Madison avenue

Professor of the Greek Language and Literature

A. B., Amherst, 1871; A. M., Amherst, 1883; Principal, Mound Street School, Columbus, 1871–'73; Teacher, Columbus High School, 1873–'76; Assistant Professor of Ancient Languages, Ohio State University, 1876–'81; Student at Leipsic, 1881–'83; present position since 1883.

HENRY ADAM WEBER.....1342 Forsythe avenue

Professor of Agricultural Chemistry

Graduate of Polytechnic School, Kaiserslautern, 1866; Student, Chemistry under Von Liebig and Reischauer, and of Mineralogy under Von Kobell, Munich, 1866–'68; Ph. D., Ohio State University, 1879; Ohio Geological Survey, Chemical Department, 1869–'74; Professor of General Chemistry and Mineralogy, Illinois State University, 1874–'82; Chemist to State Board of Agriculture, Illinois, 1874–'82; Chemist to State Board of Health, Illinois, 1874–'82; State Chemist and Chief Chemist to Ohio State Dairy and Food Commissioner, 1885–'97; present position since 1884.

BENJAMIN FRANKLIN THOMAS.....University Grounds

Professor of Physics, and State Sealer of Weights and Measures

B. Sc., Ripon, 1874; M. Sc. Ripon, 1877; Ph. D., Stevens Institute, 1880. Instructor in Mathematics and Physics, Carleton College, Northfield, Minnesota, 1876–'79; Professor of Physics, University of Missouri, 1880–'85; Member of the Board of Examiners at the International Electrical Exhibition at Philadelphia, 1884; Member of the Jury of Awards, Department of Electricity, at the World's Columbian Exposition, Chicago, 1893; present position since 1885.

GEORGE WELLS KNIGHT.....University Grounds

Professor of American History and Political Science and of Constitutional Law

A. B ,.University of Michigan, 1878; A. M., University of Michigan, 1883; Ph. D., University of Michigan, 1884; Student, Law, University of Michigan, 1878–'79; Principal of High School, Lansing, Michigan, 1879–'81; Student, History and Political Science, University of Michigan, 1882–'84; Instructor in History, Ann Arbor High School, 1883–'85; Professor of History and English Literature, Ohio State University, 1885–'87; Professor of History and Political Science, Ohio State University, 1887–'98; Student at Universities of Halle, Berlin, and Freiburg, 1889–'90; present position since 1898.

ROSSER DANIEL BOHANNAN.....Sixteenth and Indianola avenues

Professor of Mathematics

B. Sc., C. E., E. M., University of Virginia, 1876; Student of Mathematics and Physics, Cambridge, England, 1880–'82; Göttingen, 1882–'83; Teacher of Mathematics and Latin, Suffolk Collegiate Institute, Virginia, 1876–'77; Teacher of Mathematics and English, New York Latin School, New York City, 1877–'78; Professor of Mathematics and Natural Science, Emory and Henry College, 1878–'80; Acting Professor of Mathematics, University of Virginia, 1883–'84; Assistant in Mathematics and Physics, University of Virginia, 1884–'87; Professor of Mathematics and Astronomy, Ohio State University, 1887–'95; present position since 1895.

C. NEWTON BROWN.....1343 Forsythe avenue

Professor of Civil Engineering

C. E., Miami, 1886; Resident Engineer of the Ironton Extension of the Pittsburg, Cincinnati, Chicago & St. Louis R. R., 1881; Ohio Geological Survey, 1882; Assistant in Mathematics and Civil Engineering, Ohio State University, 1883–'85; Associate Professor of Civil Engineering, Ohio State University, 1885–'90; present position since 1890.

ERNST AUGUST EGGERS.....190 West Eleventh avenue, University Grounds

Professor of Germanic Languages and Literatures

Student in Gymnasium at Hanover, at Michigan State Normal School, the Sorbonne, College de France; Instructor in German in the High Schools of Michigan for ten years; Assistant in German, Ohio State University, 1886–'88; Assistant Professor of German, same institution, 1888–'90; present position since 1890.

ALBERT MARTIN BLEILE.....218 King avenue

Professor of Anatomy and Physiology

M. D., Starling Medical College, 1876; Student, Vienna, Chemistry and Physiology, 1876–'77; Student, Physiology, Leipsic, 1877–'78; Student Anatomy and Histology, Paris, 1878–'79; Lecturer on Experimental Physiology, Starling Medical College, 1879; Professor of Physiology, Starling Medical College, 1884; present position since 1891.

WILLIAM ASHBROOK KELLERMAN.....175 Eleventh avenue

Professor of Botany

B. Sc., Cornell, 1874; Ph. D., Zurich, 1881; Professor of Natural Science, Wisconsin State Normal School, 1874–'79; Professor of Botany and Horticulture, Kentucky State College, 1881–'82; Professor of Botany and Zoology, Kansas State Agricultural College, 1883–'87; Professor of Botany, Kansas State Agricultural College, 1888–'91; Botanist, Kansas State Board of Agriculture, 1883–'91; Ohio Geological Survey (Botany) 1892–'93; Founder and Editor of the Journal of Mycology, 1885–'89; present position since 1891.

THOMAS FORSYTH HUNT.....188 West Tenth avenue

Professor of Agriculture, and Dean of the College of Agriculture and Domestic Science

B. Sc., University of Illinois, 1884; M. Sc., University of Illinois, 1892; Assistant to Illinois State Entomologist, 1885–'86; Assistant in Agriculture, University of Illinois, 1886–'88; Assistant Agriculturalist, Illinois Experiment Station, 1888–'91; Professor of Agriculture, Pennsylvania State College, 1891–'92; present position since 1892.

GEORGE BEECHER KAUFFMAN.....University Grounds

Professor of Pharmacy, and Dean of the College of Pharmacy

B. Sc., Ohio Wesleyan University, 1877; Pharm. D., Scio, 1894; Associate Professor of Pharmacy, Ohio State University, to 1894; present position since 1894.

BENJAMIN LESTER BOWMAN.....775 East Broad street

Professor of Romance Languages and Literature

A. B., University of Rochester, 1881; Ph. D., Johns Hopkins University, 1888. Postgraduate work, University of Rochester, 1881–'82; Professor of Languages, New Windsor College, Maryland, 1882–'83; Graduate Student and Assistant in French, Johns Hopkins University, 1883–'86, and 1887–'88; Student at the University of Paris, Bonn, Rome and Madrid, 1885, and 1886–'87; Professor of French and Latin, Bowdoin College, 1888–'89; Acting Associate Professor of French Language and Literature, Ohio State University, 1889–'90; Associate Professor of Romance Languages and Literatures, Ohio State University, 1890–'94; present position since 1894.

JOSEPH VILLIERS DENNEY.....230 West Tenth avenue

Professor of Rhetoric and the English Language, and Secretary of the University Faculty

A. B., University of Michigan, 1885. Journalist, 1885–'88; Principal of the Aurora (Illinois) High School, 1888–'90; Instructor in English and Graduate Student, University of Michigan, 1890–'91; Associate Professor of Rhetoric, Ohio State University, 1891–'94; present position since 1894.

ALLEN CAMPBELL BARROWS.....85 West Tenth avenue

Professor of English Literature, and Dean of the College of Arts, Philosophy and Science

A. B., Western Reserve, 1861; A. M., Western Reserve, 1866; D. D., Iowa College, 1889. Teacher, Latin and Greek, Phillips Academy, 1865–'66; Professor of Physics, Western Reserve, 1866–'70; Professor of Latin and English Literature, Western Reserve, 1870–'71; Professor of English Literature and History, Iowa Agricultural College, 1887–'94; present position since 1894.

EDWARD ORTON, JR.....The Normandie

Director of the Department of Clay-Working and Ceramics

E. M., Ohio State University, 1884. Assistant on Ohio Geological Survey, 1882; Chemist for Columbus and Hocking Coal and Iron Company, 1885–'86; Superintendent of Blast Furnace at New Straitsville, O., 1887–'88; Superintendent of Victoria Furnace, Goshen Bridge, Va., 1888; Steel Worker, Homestead Steel Works, Homestead, Pa., 1889; Superintendent Ohio Paving Company's Factory, Columbus, Ohio, 1890–'92; Special Assistant on Clays, Ohio Geological Survey, 1892; Superintendent Acme Vitrified Brick Co., Louisville, Kentucky, 1893; State Geologist of Ohio, 1899; present position since May, 1894.

WILLIAM FORREST HUNTER.....1032 Bryden Road; 18 Board of Trade

Dean of the College of Law, Professor of the Law of Sales, Bailments, Evidence, Mortgages, Suretyship, Construction of Contracts, Law of Corporations, Judge of Moot Courts

Admitted to the Bar in 1861; Student, University of Michigan Law School; practicing attorney since 1866; Dean of the Law School, Ohio State University, 1892–'96; present position since 1896.

DAVID FRANKLIN PUGH.....1320 Highland street; Board of Trade

Professor of Equity Jurisprudence, Law of Real Property and Municipal Corporations

Member of West Virginia Constitutional Convention, 1872; Member of Legislature, West Virginia, 1874–'75; Prosecuting Attorney, Tyler County, West Virginia, 1870–'80; Common Pleas Judge, Franklin County, Ohio, 1887–'99; present position since 1891.

EMILIUS OVIATT RANDALL.....1025 Oak street; Supreme Court Room

Professor of Agency, Commercial Law and Partnership

Ph. B., Cornell, 1874; LL. B., LL. M., Ohio State University, 1892. Admitted to practice, 1890; Secretary Ohio State Historical Society; Reporter Supreme Court of Ohio. Present position since 1893.

EDGAR BENTON KINKEAD.....Wyandotte avenue; Board of Trade

Professor of Pleading and Probate Practice, Torts, Criminal Law, Ethics, Trial Practice and Law of Contracts (Engineers)

Assistant State Law Librarian, 1887–1894; Special Counsel for Attorney-General of Ohio, 1897–1900. Present position since 1895.

WILLIAM HERBERT PAGE.....1068 Franklin avenue; 27 Board of Trade

Professor of Elementary Law, Contracts and Wills

B. A., Yale, 1889; LL. B., Ohio State University, 1892; LL. M., same institution, 1894. Instructor in Central High School, Columbus, Ohio, 1889–'96. Present position since September, 1896.

WILLIAM THOMAS MAGRUDER.....191 King avenue

Professor of Mechanical Engineering

M. E., Stevens Institute of Technology, 1881. Practical Experience in Machine Design and Shop Practice, Taunton, Mass., 1881–'86. Student in Chemistry and Mathematics, etc., Johns Hopkins University, 1886–'87; Professor of Mechanical Engineering (practical and theoretical) Vanderbilt University, 1887–'96; present position since September, 1896.

J. P. GORDY.....The Normandie
Professor of Education

Ph. D., University of Leipsic, 1884; LL. D., Western University of Pennsylvania, 1897. Student in Philosophy at Leipsic, 1883–'84; Student in Philosophy at Johns Hopkins University, 1886; Assistant in Revision of Webster's Dictionary, 1884–'85; Professor of Philosophy and Pedagogy, Ohio University, Athens, 1886–'96; present position since September, 1896.

WILLIAM McPHERSON.....97 Hamilton avenue
Professor of Chemistry

B. Sc., Ohio State University, 1887; M. Sc., Ohio State University, 1890; D. Sc., Ohio State University, 1895; Ph. D., University of Chicago, 1899; Instructor in Chemistry and Physics, Toledo High School, 1887–'89; Instructor in Chemistry and Latin, Toledo High School and Manual Training School, 1889–'92; Assistant in Chemistry, Ohio State University, 1892–'93; Assistant Professor in Chemistry, Ohio State University, 1893–'95; Associate Professor, General Chemistry, Ohio State University, 1895–'97; present position since 1897.

JOSEPH NELSON BRADFORD.....54 West Tenth avenue
Professor of Drawing

M. E., Ohio State University, 1883. Draftsman, Ohio Geological Survey, 1882; Machinist and Draftsman, Pittsburg, Cincinnati & St. Louis Railroad, 1883–85; Assistant in Mechanical Engineering and Drawing, Ohio State University, 1885–'90; Assistant Professor of Drawing, Ohio State University, 1890–'93; Associate Professor of Drawing, Ohio State University, 1893–'99. Present position since 1899.

DAVID STUART WHITE.....West Fifth avenue
Professor of Veterinary Medicine, and Dean of the College of Veterinary Medicine

D. V. S., Ohio State University, 1890. Student, Royal Veterinary Schools of Hanover, Berlin, 1890–'91; at Imperial Veterinary Institute of Vienna, 1892; Royal Veterinary College of Dresden, 1893; Assistant in Veterinary Medicine, Ohio State University, 1893–'95. Present Position since 1895.

HERBERT OSBORN.....485 King avenue
Professor of Zoology and Entomology

B. Sc., Iowa Agricultural College, 1879. M. Sc., same institution, 1880. Student of Entomology at Museum Comparative Zoology (Cambridge, Mass.) 1881–'82; College of Physicians and Surgeons, Des Moines, 1884–85 (Anatomy and Physiology); Zoological Station Naples (Smithsonian table), 1894–'95. Assistant in Zoology and Entomology, Iowa Agricultural College, 1880–'83; Assistant Professor of Zoology and Entomology, Iowa Agricultural College, 1884–'85. Professor of Zoology and Entomology, Iowa Agricultural College, 1886–'98; Special Agent Division of Entomology, U. S. Department of Agriculture, 1885–'94; Entomologist, Iowa Experiment Station, 1890–'98; State Entomologist, Iowa, 1898. Present position since 1898.

FRANK EDWIN SANBORN.....380 West Eighth avenue
Director of the Department of Industrial Arts

S. B., in Mechanical Engineering, Massachusetts Institute of Technology, 1889. Assistant in Drawing, Massachusetts Institute of Technology, 1889–'90; Teacher in Manual High School Department, Pratt Institute, 1890–'91; Walker Special Instructor, Tufts College, 1891–'94; Instructor in Mechanical Department, Tufts College, 1894–'98. Present position since September, 1898.

HENRY CURWEN LORD.....401 West Sixth avenue
Director of the Emerson McMillen Observatory, and Associate Professor of Astronomy

B. Sc., University of Wisconsin, 1889. Assistant in Washburn Observatory, University of Wisconsin; with Thompson-Houston Electric Company, 1889; Assistant in Mathematics and Astronomy, Ohio State University, 1891–'94; elected Fellow, Royal Astronomical Society, 1897; Present position since 1895.

CHRISTOPHER P. LINHART.....Gymnasium; The Vendome

Director of the Gymnasium, and Instructor in Physical Education

M. D., Western Reserve University, Cleveland, 1882. Post-graduate student, same institution, 1882-'88. Student and Instructor, Dr. Anderson's Normal School of Physical Education, 1886; student in Harvard Summer School, 1887; House Physician and Surgeon, Cleveland City Hospital, 1883-'85; Assistant Demonstrator of Anatomy, Western Reserve University, 1885-'86, and Assistant Visiting Physician Charity Hospital, Cleveland, 1886; Director of Y. M. C. A. Gymnasium, Orange, N. J., 1886 and 1888; Instructor in Physiology and Physical Education, Newark, (N. J.), Academy, 1887 and 1890, and Director of Physical Education, Newark, N. J., Public Schools, 1888-'90; Medical Director Manhattan Athletic Club, 1891 and 1892; Instructor in Physiology and Physical Education, Union College, 1892-'97. Present position since 1897.

JAMES MADISON BURNS.....The Columbus Club

Professor of Military Science and Tactics

Graduate of the Beaver Academy, Pennsylvania. Entered the volunteer service 1861; discharged July 17th, 1865. Appointed second lieutenant 17 infantry U. S. A.; promoted to first lieutenant and captain same regiment; served thirty-one years in that organization, the greater portion of the time on the extreme frontier. Promoted to major and retired on account of disability incurred in the line of duty, May 22, 1899. Appointed to present position October 1st, 1899.

FRANK ARNOLD RAY.....137 King avenue

Associate Professor of Mine Engineering

E. M., Ohio State University, 1887. Superintendent building construction, Elah Terral & Co., 1887-'88; Assistant Mining Engineer C. & H. C. & I. Co, 1888-'89; Chief Engineer C. & H. C. & I. Co, 1889-92; Chief Engineer Congo Coal Mining Co., 1892-'95; Assistant Professor of Mine Engineering, O. S. U., 1895-'97; present position since 1897.

FRANCIS CARY CALDWELL.....55 Cleveland avenue

Associate Professor of Electrical Engineering

A. B., Cornell, 1890; M. E. Cornell, 1891. With Thompson-Huston Electric Co., Lynn Mass., 1891-'92; Student at the National Polytechnic, Zurich, 1892-'93; Assistant Professor of Electrical Engineering, Ohio State University, 1893-'97. Present position since 1897.

PERLA G. BOWMAN.....The Dennison

Associate Professor of Domestic Science; in charge of the Department of Domestic Economy

Graduate of Toledo High School; Graduate of Toledo Manual Training School; Student at Wells College; Instructor in Toledo Manual Training School; Director of Domestic Science, Toledo Manual Training School; Special Student at Pratt Institute (Brooklyn), and the University of Michigan. Present position since September, 1897.

FREDERICK CONVERSE CLARK.....1634 Neil avenue

Associate Professor of Economics and Sociology

A. B., University of Michigan, 1887; A. M., University of Michigan, 1888; Ph. D., University of Michigan, 1891. Student at Halle and Berlin, 1893-'95; Instructor in History and Economics, Ann Arbor High School, 1888-'92; Assistant Professor of Political Economy, Stanford University, 1892-'93; Assistant Professor of Economics and Sociology, Ohio State University, 1895-'98. Present position since 1898.

WILBUR HENRY SIEBERT.....1332 Highland street

Associate Professor of European History

A. B., Ohio State University, 1888; A. B., (with honorable mention) Harvard University, 1889; M. A., Harvard, 1890. Student, Freiburg and Berlin, 1890-'91; Student, Harvard, 1895; Assistant in History and Political Science, Ohio State University, 1891-'93; Assistant Professor of History, Ohio State University, 1893-'95, 1897-'98; Student, Harvard University, 1895-'97. Present position since 1898.

OLIVE B. JONES.....53 Eleventh avenue
Librarian

Assistant Librarian, 1887. Present position since 1893.

EMBURY ASBURY HITCHCOCK.....380 West Eighth avenue
Associate Professor of Experimental Engineering

M. E., Cornell, 1890. Straightline Engine Company, Syracuse, N. Y., 1889; Corliss Steam Engine Company, Providence, R. I., 1890–'93; Assistant in Mechanical Engineering, Ohio State Univerversity, 1893–'95; Assistant Professor of Mechanical Engineering in charge of the Department, 1895–'96; Assistant Professor, Experimental Engineering, Ohio State University, 1896–'97. Present position since 1897.

WILLIAM DAVID GIBBS.....The Dennison
Associate Professor of Agriculture

B. Sc., University of Illinois, 1893. Fellowship in Agriculture, University of Illinois, 1893–'94; Post-graduate work, University of Illinois and University of Wisconsin, 1895; Expert Assistant in Division of Agricultural Soils of the United States Department of Agriculture, summer of 1895; Teacher of Bacteriology, University of Illinois, fall term, 1893; Assistant in Animal Husbandry, University of Illinois, winter term, 1894; Assistant in Agriculture, Ohio State University, spring and fall terms, 1895; Assistant Professor of Agriculture, 1895–'98. Present position since 1898.

STELLA ELLIOTT CANFIELD.....1457 Worthington street
Associate Director of the Gymnasium

Student, University of Nebraska, three years; Chautauqua School of Physical Education, summer of 1897; Assistant in Physical Training, University of Nebraska, two years; Y. M. C. A. classes in Physical Training, Lincoln, Nebraska, one year, and in Aurora, Illinois, one year; Medical Gymnastic Course, Chautauqua School of Physical Education, Summer, 1899; Assistant Director of Gymnasium, 1897–'98. Present position since 1898.

GEORGE WASHINGTON McCOARD.....325 West Sixth avenue
Associate Professor of Mathematics

B. A., Bethany, West Virginia, 1873; M. A., Bethany, 1882. Principal of Oakdale Classical Normal Institute, Allegheny County, Pennsylvania, 1873–'74; Private Tutor in Cleveland, Ohio, 1874–'80; Principal of Public Schools, Irving Park, Chicago, 1880–'81; Teacher of Latin and Mathematics, Columbus High School, 1881–'82; Assistant in Mathematics and Latin, Ohio State University, 1882–'87. Assistant Professor of Mathematics, Ohio State University, 1887–'99. Present position since 1899.

CHARLES WALTER MESLOH.....University Grounds
Associate Professor of Germanic Languages and Literatures

A. B., Ohio State University, 1889; M. A., Ohio State University, 1895. Student in the University of Chicago, 1894; Student, University of Berlin, 1896–'97; Assistant in German, Ohio State University, 1889–'95. Present position since 1895.

ARTHUR WINFRED HODGMAN.....164 West Ninth avenue
Associate Professor of the Classic Languages

A. B., Harvard, 1890; A. M., Harvard, 1893; Ph. D. (Classical Philology) Harvard, 1896. Student in Graduate School, Harvard, Classical Philology, 1892–'96. Instructor in Preparatory Schools, Quincy, Duxbury, Mass., 1890–'92; Assistant in Greek and Latin, Ohio State University, 1896–'97. Assistant Professor of the Classic Languages, Ohio State University, 1897–'99. Present position since September, 1899.

CHARLES SMITH PROSSER.....1362 Highland street
Associate Professor of Historical Geology

B. S., Cornell University, 1883; M. S., Cornell University, 1886. Fellow in Natural History, Cornell, 1884–'85; Instructor in Paleontology, Cornell University, 1885–'88; Assistant Paleontologist, U. S. Geological Survey, 1888–'92; Professor of Natural History, Washburn College, Topeka, Kansas, 1892–'94; Assistant Geologist, U. S. Geological Survey, 1893–'94; Professor of Geology, Union College, Schnectady, N. Y., 1894–'99. Assistant Geologist, N. Y. Geological Survey, 1895–'99; Assistant Geologist, University Geological Survey of Kansas, 1896; Chief of Appalachian Division, Maryland Geological Survey since 1898. Present position since 1899.

JOHN ADAMS BOWNOCKER.....1594 Neil avenue
Associate Professor of Inorganic Geology

B. Sc., Ohio State University, 1889; D. Sc., Ohio State University, 1897. Principal of High School, Martins Ferry, 1889–'92; Fellow in Geology, University of Chicago, 1892–'94; Graduate Scholar, Yale University, 1894–'95; Assistant Geological Survey of Ohio, 1892; Assistant Geological Survey of New Jersey, 1893; Assistant in Geology, 1895–'98. Assistant Professor 1898–'99. Present position since 1899.

JOHN WRIGHT DECKER.....329 West Eighth avenue
Associate Professor of Dairying

B. Agr., University of Wisconsin, 1890. Fellow in Agriculture, University of Wisconsin, 1890–'91. Instructor in Dairying University of Wisconsin, 1891–99. Present position since 1899.

JAMES ELLSWORTH BOYD.....25 Maynard avenue
Assistant Professor of Physics

B. Sc., Ohio State University, 1891; M. Sc., Cornell, 1896. Student in Physics and Mathematics, Ohio State University, 1893–'95; Student in Experimental and Theoretical Physics, Cornell, 1895–'96; also Student in Sibley College of Mechanic Arts, Cornell, summer of 1895. Assistant in Physics, Ohio State University, 1891–'95; held scholarship in Physics, Cornell, 1895. Present position since September, 1896.

JOSEPH RUSSELL TAYLOR.....The Dennison
Assistant Professor of English Literature

B. A., Ohio State University, 1887; M. A., Columbia University, 1897. Assistant in Drawing, Ohio State University, 1889–'94; Assistant in Rhetoric, Ohio State University, 1894–'97; University Fellow in Literature, Columbia University, 1896–'97; Assistant Professor of Rhetoric, Ohio State University, 1897–'99; present position since 1899.

CHRISTOPHER ELIAS SHERMAN.....772 Oak street
Assistant Professor of Civil Engineering

C. E., Ohio State University, 1894. Engaged in Civil Engineering in Ohio, Tennessee, Virginia, North Carolina and Arizona for three years during college course. Engaged in railroad, geological and governmental engineering from graduation until September, 1896. Engineer to Park Commission, Springfield, Ohio, and U. S. Assistant Engineer at Tampa, Florida, and Huntsville, Alabama, summer of 1898. U. S. Assistant Engineer on road surveys of Yellowstone National Park, summer of 1899. Assistant in Civil Engineering, Ohio State University, 1896–'97. Present position since 1897.

WILLIAM LUCIUS GRAVES.....1313 Forsythe avenue
Assistant Professor of Rhetoric

B. A., Ohio State University, 1893; M. A., Ohio State University, 1897. Principal High School, Coshocton, 1894–'95; Fellow and Assistant in Rhetoric and English Language, Ohio State University, 1895–'96. Present position since 1896.

*CLAIR ALBERT DYE.....169 King avenue
Assistant Professor of Pharmacy

G. Ph., Ohio State University, 1891. Post-graduate student in Chemistry and Pharmacy, Ohio State University; Assistant in Chemistry and Pharmacy, 1890–'94; Assistant in Pharmacy, 1894–'98. Present position since 1898.

THOMAS EWING FRENCH.....1458 Worthington street
Assistant Professor of Drawing

M. E., Ohio State University, 1895. Assistant in Drawing Department three years preceding graduation; Draftsman, The Smith-Vaile Company, Dayton, 1888–'90; Instructor in Mechanical Drawing, Y. M. C. A., Dayton, 1888–'91; Chief Draftsman, The Smith-Vaile Company, Dayton, 1891; Assistant in Drawing, 1892–'98. Present position since 1898.

*CHARLES WILLIAM FOULK.....Leipzig, Germany
Assistant Professor of Analytical Chemistry

B. A., Ohio State University, 1894. Assistant in General Chemistry, 1896–'98. Present position since September, 1898.

* In Europe on leave of absence.

CHARLES LINCOLN ARNOLD.....328 West Eighth avenue

Assistant Professor of Mathematics

B. Sc., Ohio State University, 1890; M. Sc., Ohio State University, 1894. Post-graduate Student, University of Chicago and Ohio State University, 1894–'95. Assistant in Methematics Ohio State University, 1890–'99. Present position since 1899.

KARL DALE SWARTZEL.....57 East Eighth avenue

Assistant Professor of Mathematics

B. Sc., Ohio State University, 1893; M. Sc., Ohio State University, 1894. Fellow and Assistant in Mathematics, Ohio State University, 1894–'95. Assistant in Mathematics, Ohio State University, 1895–'99. Present position since 1899.

CHARLES A. BRUCE.....234 West Tenth avenue

Assistant Professor of the Romance Languages

A. B., Ohio State University, 1895; Student of French, Amherst, Summer School, 1895; Graduate Student, University of Chicago, Summer Quarter, 1896; Student, University of Geneva, Summer School, 1898; Student at the Sorbonne, College de France, and Ecole des Hautes-Etudes, Paris, 1898–'99; Assistant in French, Ohio State University, 1895–'99. Present position since 1899.

JOHN H. SCHAFFNER.....61 West Eleventh avenue

Assistant Professor of Botany

A. B., Baker University, Kansas, 1893. A. M., University of Michigan, 1894; M. S., Baker University, 1896. Student in Botany, Zoology and Geology, University of Michigan, 1893–'95. Student in Botany and Paleo-Botany, University of Chicago, 1896–'97. Assistant in Botany, University of Michigan, 1894–'95. Professor of Natural Sciences, South Dakota University, 1895–'96; Assistant in Botany, Ohio State University, 1898–'99. Present position since 1899.

CHARLES BYRON FREDERICK.....Veterinary Hospital

Assistant in Veterinary Medicine.

V. M. and S., Ontario Veterinary College, 1893. In practice since graduation. Fellow in Veterinary Medicine, 1897–'98; Assistant in Veterinary Medicine, 1898. Present position since 1898.

CORNELIA PORTER SOUTHER.....The Dennison

Assistant Professor of Domestic Art

Graduate of Mary Institute (Washington University), St. Louis, Mo., 1883; Certificated Student at Mary Institute, 1883–'85; Handarbeitslehrerinnen-Seminar des Carola-Vereins, Leipzig, 1896–'97. Investigations in Domestic Art Methods in foreign cities, 1896–'98; Teacher of Sewing, Mrs. Ball's Private School, St. Louis, 1898; Special Student at Pratt Institute, Brooklyn, and Teachers' College, Columbia University, New York. Present position since February, 1899.

CHARLES BRADFIELD MORREY.....86 King avenue

Assistant Professor of Anatomy and Physiology

B. A., Ohio State University, 1890; Post-graduate Student, Ohio State University, 1890–'91; M. D., Starling Medical College, 1896. Assistant in Latin, Ohio State University, 1890–91; Assistant in Latin and Physiology, 1891–92; Assistant in Physiology, Ohio State University, 1892–'95; Student in Vienna and Paris, 1897–'99. Present position since 1899.

WILLIAM EDWARDS HENDERSON.....41 West Eleventh avenue

Assistant Professor of Analytical Chemistry

A. B., University of Wooster, 1891; M. A., 1894; Ph. D., Johns Hopkins University, 1897. Graduate Student Johns Hopkins University, 1893–'97. Fellow in Chemistry, Johns Hopkins University, 1896 '97. Professor of Natural Sciences, College of Emporia, Kansas, 1891–'93. Professor of Chemistry, Ohio University, 1897–'99. Present position since 1899.

GEORGE H. McKNIGHT.....748 Neil avenue

Assistant Professor of Rhetoric and English Language

A. B., Cornell, 1892, Ph. D., Cornell, 1896. Instructor in English at Cornell, 1892–'97; Cornell Traveling fellow in English Philosophy, 1897–'98. Student in Freiburg, 1897–'98. Student in Paris and London, 1898–'99. Present position since 1899.

WALTER ALEXANDER LANDACRE.....1574 Summit street
Assistant Professor of Pharmacy

G. Ph. Ohio State University, 1891. Chemist Braun Sons & Co., 1891–'97. Post-graduate Student Ohio State University, 1897–'99. Present position since 1899.

HERRICK CLEVELAND ALLEN.....The Dennison
Assistant Professor of Public Speaking

Student Union College 1894–'95–'96. LL. B. Cornell University, 1898. Instructor Department of Oratory and Debate, Cornell University, 1898,'99. Present position since 1899.

WILLIAM FINLEY LAVERY.....North Dormitory
Assistant in Veterinary Medicine.

D. V. M., Ohio State University, 1890. Veterinary practitioner, 1892–'96. Present position since 1896.

JAMES HENRY COLLINS.....57 Lexington avenue; Ruggery Building
Lecturer on Federal Practice

In practice for thirty years. Present position since 1891.

JOHN ALLEN SHAUCK.....95 Winner avenue; Supreme Court Room
Lecturer on Supreme Court Practice and Special Cases

B. A., Otterbein University; LL. B., University of Michigan, 1867; A. M., Otterbein University, 1870; LL. D., Otterbein University, 1897. Judge of the Supreme Court of Ohio.

J. WARREN SMITH.....55 Cleveland avenue
Lecturer on Meteorology

WILLIAM ABNER KNIGHT.....206 West Lane avenue
Assistant in the Industrial Arts and Instructor in Machine Work

Thirteen years' practical experience in workshops. Present position since 1893.

HARRIET TOWNSHEND.....53 West Eleventh avenue
Assistant in Library

Present position since September, 1895.

THOMAS KENYON LEWIS.....1293 Dennison avenue
Assistant in Drawing

B. Sc., Ohio State University, 1894. Graduate Student, Ohio State University, 1894–'95. Summer of 1897 and summer of 1898 at Cincinnati Art Academy. Present position since graduation.

FRANCIS LEROY LANDACRE.....1332 Highland street
Assistant in Zoology

B. A., Ohio State University, 1895. Student in Chicago University, summer quarters of 1898 and of 1899. Professor of Embryology in Ohio Medical University since 1896. Present position since graduation.

JAMES STEWART HINE.....26 West Fourth avenue
Assistant in Entomology

B. Sc. (H. and F.), Ohio State University, 1893. Superintendent of the N. W. Substation of the Ohio Agricultural Experiment Station, 1893. Assistant in Horticulture, Ohio State University, 1894. Student in Entomology, Cornell, 1895. Assistant in the Division of Entomology of the United State Department of Agriculture, summers of 1897 and 1899. Present position since 1895.

MAUD DOROTHY JEFFREY.....65 West Eleventh avenue
Assistant in Library

B. Ph., Ohio State University, 1895. Student of Library Science, Ohio State University, 1895–'96. Student of Library Science, Amherst, summer of 1897. Present position since September, 1896.

GERTRUDE STOWELL KELLICOTT.....1332 Highland street
Assistant in Library

Student, Ohio State University, 1888–'95. Student of Library Science, Ohio State University, 1895–'96. Student of Library Science, Amherst, summer of 1897. Present position since September, 1896.

ALBERT EARL VINSON.....134 West Ninth avenue
Assistant in Agricultural Chemistry

Instructor in Chemistry, Y. M. C. A., Dayton, Ohio, 1895. Present position since September, 1896.

FREDERICK EDWARD KESTER.....1473 Neil avenue
Instructor in Physics

M. E. (in E. E.), Ohio State University, 1895. M. A., Cornell, 1899. Fellow and Assistant in Physics, Ohio State University, 1895–'97. Assistant in Physics, Ohio State University, 1897–'98, held scholarship in Physics, Cornell, 1898. Present position since 1899.

FRANK RUHLEN.....North Dormitory
Assistant in Agriculture

B. Sc., (Agr.) Ohio State University, 1896.

LUCY ALLEN.....1490 Neil avenue
Assistant in Library

B. A., Ohio State University, 1897. M. A., Ohio State University, 1899. Student in Library Science under Dr. G. E. Wire, summer of 1898 at Ohio State University. Student in Harvard University, summer of 1899. Present position since September, 1898.

ALBERT V. BLEININGER.....North Dormitory
Laboratory Assistant, Department of Clay Working and Ceramics

Present position since 1898.

EDWARD EVERETT SOMMERMEIR.....1590 Neil avenue
Assistant in Metallurgy and Mineralogy

G. Ph., Ohio State University, 1898. Student Laboratory Assistant in Chemistry, 1897–'98. Present position since September, 1898.

DON CARLOS HUDDLESON.....249 West Lane avenue
Assistant in Gymnasium

G. Ph., Ohio State University, 1897. Medical Student, 1897. Summer School of Physical Training Chautauqua, 1898. Present position since 1898.

BURT BIDWELL HERRICK.....167 Tenth avenue
Instructor in Cheese Making

ELISHA SMITH .....
Assistant in Cheese Making

JOSEPH HENRY VOSSKUEHLER .....201 West Eleventh avenue
Assistant in Drawing

Designer, Gross Lithographing Co., Dayton, Ohio, 1889–'90; Draftsman, The Stilwell-Bierce and Smith-Vaile Co., Dayton, 1890–'96; Finckel & Finckel, Patent Attorneys, Columbus, 1897. Present position since September, 1898.

CLAUDE B. GUITTARD.....80 McMillen avenue

Assistant in Library

Student in Ohio State University, 1892–'96, Assistant in Ohio State Library, 1897–'98. Student in Library Science, Washington, D. C., summer of 1899. Present position since November, 1898.

WILLIAM HENRY RENCK.....910 West Rich street

Assistant in Industrial Arts and Foreman of the Carpenter and Pattern Shops.

Fifteen years' practical experience in pattern shops and foundries, seven years as foreman. Present position since 1899.

CHARLES PHILIP CROWE.....971 Highland street

Assistant in Industrial Arts and Forge Master.

Student, Ohio Business College, Delaware, Ohio; Lebanon Normal School, Lebanon, Ohio; Teacher in Public Schools of Delaware and Union Counties, two years; Forge shop experience, seven years; Manufacturer of Steel Forgings and Springs, six years. Present position since 1899.

HOMER CHARLES PRICE.....1594 Neil avenue

Assistant in Horticulture and Forestry

B. Sc. (Agr.), Ohio State University, 1897. M. S. A., Cornell University, 1899.; Fellowship in Agriculture, Cornell, 1898–'9. Present position since September, 1899.

JOHN WESLEY GROVES.....

Assistant in Civil Engineering

C. E., Ohio State University, 1898. Engineer for the C. & H. C. & I. Co., 1898–'99. Present position since October, 1899.

FRANCIS MARION HAMILTON.....1355 North High street

Assistant in Philosophy and Education.

B. A., Indiana University, 1897. Graduate Student in Philosophy and Education, Indiana University, 1897–'98. Assistant in Philosophy, Indiana University, 1897–'98. Assistant Director of Association College, Central Y. M. C. A., Chicago, 1898–'99. Fellow-elect in Psychology in Clark University for 1899–1900. Present position since 1899.

DELBERT ALONZO CROWNER.....North Dormitory

Assistant in Butter Making

FRED ALAN FISH.....229 West Eleventh avenue

Assistant in Electrical Engineering

M. E. (in E. E.), Ohio State University, 1898. Fellow and Laboratory Assistant, 1898–'99; present position since 1899.

JOHN B. SANBORN.....215 West Tenth avenue

Assistant in American History

B. L., University of Wisconsin, 1896; M. L., University of Wisconsin, 1897; Ph. D., University of Wisconsin, 1899. Graduate Student of Wisconsin, 1896–'99. Graduate Scholar in American History, University of Wisconsin, 1898–'99. Present position since 1899.

OLIVER V. BRUMLEY.....University Grounds

Assistant in Veterinary Medicine

Veterinary Surgeon's Certificate, Ohio State University, 1897. Practiced 1897–'98. Present position since 1898.

SILAS MARTIN.....1269 Dennison avenue

Assistant in Drawing

Studied Art with J. H. Witt, E. F. Andrews and Homier. Private Teacher in Art for twenty years. Present position since 1899.

†FRANK ORVILLE CLEMENTS.....
Assistant in Chemistry

MELVIN DRESBACH.....236 West Eighth avenue
Fellow, in Anatomy and Physiology

B. Sc., Ohio State University; M. Sc., Ohio State University, 1899.

FREDERICK JAMES HALE.....75 West Third avenue
Fellow, and Laboratory Assistant in Mechanical Engineering

M. E., Ohio State University, 1898.

JOHN BERNARD PARKER.....43 East Ninth avenue
Fellow, and Assistant in Rhetoric

B. A., Ohio State University, 1898. Present position since September, 1898.

EMMA LEANNA BALL.....207 West Eighth avenue
Fellow, and Assistant in Mathematics

B. Sc., Ohio State University, 1895; M. Sc., same institution, 1896.

ALFRED HEBER McINTIRE.....84 Fifteenth avenue
Fellow in Industrial Arts

M. E. (in E. E.), Ohio State University, 1898.

DONALD ALEXIS KOHR.....1590 Neil avenue
Fellow, and Laboratory Assistant in Chemistry

B. Ph., Ohio State University, 1898. Graduate Student in Chemistry and Mathematics, 1898–'99. Laboratory Assistant in Chemistry, 1898–'99.

JOHN WESLEY YOUNG.....883 Eeast Main street
Fellow, and Assistant in Mathematics

B. Ph. Ohio State University, 1899.

HAROLD WARNER BROWN.....242 King avenue
Fellow, and Assistant in Physics

B. Sc., Cornell, 1898. Present position since 1899.

†HERBERT W. KENNEDY.....164 West Ninth avenue
Emerson McMillin Fellow

SAMUEL WILLIAMSON COLLETT.....48 Woodruff avenue W
Fellow in Botany

B. Sc., Moore's Hill College, Indiana; M. Sc., Moore's Hill College, 1894; Teacher of Physiology and Chemistry, High School, and Normal College, Glidden, Iowa, 1890–'91; Professor of Natural Science, Taylor University, Upland, Ind., 1893–'96; Professor of Natural Science, Dakota University, Mitchell, South Dakota, 1896–'99.

HERBERT CHARLES GORE.....185 West Ninth avenue
Fellow and Laboratory Assistant in Chemistry

B. S., University of Michigan, 1899

† Resigned in January, 1900.

CHARLES ARTEMUS GRATE.....1610 Highland street
Fellow and Laboratory Assistant in Mechanical Engineering

M. E., Ohio State University, 1898.

GRACE L. PITTS.....245 East Gay street
Fellow in Economics

ALICE DUFOUR.....37½ Oak street
Fellow and Assistant in Botany

Ph. B., Defiance College, 1899. Student in Botanical Department O. S. U., 1898–'99.

WILLIAM C. MILLS.....91 West Frambes avenue
Curator of Archæology

B. Sc. (H. and F.), Ohio State University, 1898. Curator and Librarian of the Ohio State Archæological and Historical Society. Museum and Library, Orton Hall, O. S. U.

CHANGES, 1900-1901

WITHDRAWN

Professor John Thomas Martin, Professor James M. Burns, Associate Professor Stella Elliott Canfield, Assistant Professor Herbert James Noyes, Assistant Professor Clair Albert Dye, Assistant Professor Edwin D. Shurter, Lecturer Faxon Franklin Duane Albery, Assistant Clark Wissler, Assistant John Ferguson Cunningham, Assistant George Washington Rightmire, Assistant Joseph K. Vosskuehler, Assistant Fred A. Fish, Assistant John B. Sanborn, Fellow and Laboratory Assistant Horace Judd, Fellow and Laboratory Assistant S. W. Collett, Fellow and Laboratory Assistant Alice Dufour, Fellow and Laboratory Assistant Donald A. Kohr, Fellow and Laboratory Assistant A .V. Bleininger, Fellow and Laboratory Assistant A. H. McIntire, Fellow and Laboratory Assistant C. A. Grate, Fellow and Laboratory Assistant F. J. Hale, Fellow and Assistant Benjamin Maag, Fellow and Assistant J. W. Young, Fellow and Assistant J. B. Parker, Fellow Edward L. Fulmer, Fellow David T. Keating, Fellow Grace L. Pitts, Fellow Emma L. Ball, Fellow William Cannan, Student Assistant J. F. Jeffrey, Student Assistant Charles F. Dowd, Emerson McMillin Scholar Wilbur E. Mann.

APPOINTMENTS

CAPTAIN GEORGE L. CONVERSE, U. S. A. (Retired).....398 Oak street
Professor of Military Science and Tactics

J. WARREN SMITH.....55 Cleveland avenue
Lecturer on Meteorology

WALLACE S ELDEN.....
Assistant Professor of Classic Languages

EDWIN E. NOBLES.....71 West Tenth avenue
Assistant in Drawing

S. S. EDMANDS.....
Assistant in Electrical Engineering

S. E. RASOR.....
Assistant in Mathematics

HENRY DAVIES.....
Assistant in Philosophy

HARRIET BURR.....
Fellow in Botany

C. P. LINVILLE.....
Fellow in Chemistry

W. L. DUBOIS.....61 West Eighth avenue
Fellow in Chemistry

CHARLES F. KIMBERLEY.....225 Marshall avenue
Fellow in Chemistry

*B. H. HIBBARD.....
Fellow in Economics

MARY W. RICE.....844 Summit street
Emerson McMillin Fellow in Economics

J. F. TRAVIS.....1621 Neil avenue
Fellow in Mathematics

WILLIAM E. BOHN.....North Dormitory
Fellow in Rhetoric and English Language

C. L. C. MOORE.....68 West Tenth avenue
Student Assistant in Mathematics

W. E. DAVIS.....199 West Eleventh avenue
Student Assistant in Mathematics

CLARA MAUD BERRYMAN.....
Associate Professor of Physical Education

ALONZO H. TUTTLE.....
Instructor in American History

SELDEN F. SYMSER.....
Fellow in Economics

GEORGE W. FROST.....
Fellow in Mechanical Engineering

CHARLES B. SAYRE.....
Fellow in American History

N. O. FORD.....
Fellow in Metallurgy, Mineralogy and Mine Engineering

*Resigned.

CHANGES IN TITLES

SIDNEY AUGUSTUS NORTON,	Lecturer in Chemistry Emeritus Professor of Chemistry
WILBUR HENRY SIEBERT,	Associate Professor of History Associate Professor of European History
CHARLES BYRON FREDERICK,	Assistant in Veterinary Medicine Assistant Professor of Veterinary Medicine
WILLIAM FINLEY LAVERY,	Assistant in Veterinary Medicine Assistant Professor of Veterinary Medicine
MAUD DOROTHY JEFFREY,	Library Assistant Assistant in Library
FREDERICK EDWARD KESTER,	Assistant in Physics Instructor in Physics
LUCY ALLEN,	Library Assistant Assistant in Library
ALBERT V. BLEININGER,	Assistant Director of the Department of Clay Working and Ceramics Laboratory Assistant, Department of Clay Working and Ceramics
CLAUDE B. GUITTARD,	Library Assistant Assistant in Library
*FRANK ORVILLE CLEMENTS,	Fellow and Laboratory Assistant in Chemistry Assistant in Chemistry
W. D. GIBBS,	Associate Professor of Agriculture Professor of Agronomy
JOHN W. DECKER,	Associate Professor of Dairy Husbandry Associate Professor of Agriculture
MELVIN DRESBACH,	Fellow and Laboratory Assistant in Anatomy and Physiology Assistant in Anatomy and Physiology
H. C. LORD,	Director of the Emerson McMillin Observatory and Associate Professor of Astronomy Professor of Astronomy and Director of Emerson McMillin Observatory
HERBERT C. GORE,	Fellow and Laboratory Assistant in Chemistry Assistant in Chemistry
EDWARD ORTON, JR.,	Director of the Department of Clayworking and Ceramics Professor and Director of the Department of Clayworking and Ceramics

*Resigned in January, 1900.

CORNELIA P. SOUTHER,	Assistant Professor of Domestic Art Associate Professor of Domestic Art
F. C. CLARK,	Associate Professor of Economics Professor of Economics
C. S. PROSSER,	Associate Professor of Organic Geology Associate Professor of Historical Geology and Acting Head of the Department of Geology
J. A. BOWNOCKER,	Associate Professor of Inorganic Geology Associate Professor of Inorganic Geology and Curator of the Museum
F. E. SANBORN,	Director of the Department of Industrial Arts Professor and Director of the Department of Industrial Arts
WILLIAM H. RENCK,	Assistant and Instructor in Pattern Making Instructor in Pattern Making and Founding
W. A. KNIGHT,	Assistant and Instructor in Machine Work Instructor in Machine Work
CHARLES P. KROWE,	Assistant and Forge Master Instructor in Forging
W. F. HUNTER,	Dean and Professor of Sales, etc Dean of College of Law and Professor of Law
J. H. COLLINS,	Lecturer on Federal Practice Professor of Law
J. A. SHAUCK,	Lecturer on Supreme Court Practice Professor of Law
G. W. KNIGHT	Professor of Constitutional Law and Private Corporations Professor of Law
E. B. KINKEAD,	Professor of Pleading, etc Professor of Law
W. H. PAGE,	Professor of Elementary Law Professor of Law
E. O. RANDALL,	Professor of Agency, etc Professor of Law
D. F. PUGH,	Professor of Equity Juris, etc Professor of Law
E. A. HITCHCOCK,	Associate Professor of Experimental Engineering Associate Professor of Mechanical Engineering
FRANK A. RAY,	Associate Professor of Mine Engineering Professor of Mine Engineering

EXECUTIVE DEPARTMENT

1899-1900

WILLIAM OXLEY THOMPSON.....President
ALEXIS COPE.....Secretary Board of Trustees and Bursar
W. C. McCRACKEN.....Chief Engineer
KATHARINE H. DUNCAN.....Executive Clerk
EDITH D .COCKINS.....Registrar
CARL E. STEEB.....Accountant
CHARLES LOWE.....Assistant Engineer
THOMAS BOUDE.....First Fireman
W. E. CASE.....Second Fireman
JAMES KELLEY.....Lawnkeeper
BENJAMIN IRWIN.....Wa..tchman

JANITORS

ARTHUR CHANTLER.....University Hall
HENRY CHANTLER.....Orton Hall
G. A. GOODSPEED.....Chemical Hall
JOHN H. BROWN.....Hayes Hall
GEO. C. DENNEY.....Horticultural Hall and Veterinary Hospital
D. D. GEREN.....Gymnasium
WILLIAM WHITESTINE.....Biological Hall
M. N. COOK.....Townshend Hall

THE UNIVERSITY

OHIO STATE UNIVERSITY

HISTORY

The land grant made by the United States under an act approved by President Lincoln, July 2nd, 1862, provided that there should be granted to each State an amount of public land equal to thirty thousand acres for each Senator and Representative to which the State was entitled by the apportionment of the census of 1860. The proceeds under this act were to constitute a perpetual fund the capital of which was to remain forever undiminished and the interest of the same was to be inviolably applied by each State which should take and claim the benefits of the act to the endowment, support and maintenance of at least one "College where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such a manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Governor Tod, in November, 1862, brought the subject before the State Board of Agriculture and later to the attention of the Legislature. In January, 1864, Hon. Columbus Delano introduced a bill accepting the grant. This became a law February 9th, 1864, and pledged the faith of the State to the performance of all the conditions and provisions contained therein. In 1866, an act introduced by Hon. J. T. Brooks, was passed, which provided for the establishment of the Ohio Agricultural and Mechanical College, but the provisions were not carried into effect and a second act introduced by Hon. R. P. Cannon was passed in 1870 entitled "An act to establish and maintain an Agricultural and Mechanical College in Ohio." Under the provisions of this act the institution was located in Columbus and the Board proceeded to the organiaztion of the college and the election of a Faculty of instruction, and the institution was opened for the reception of students on the seventeenth day of September, 1873.

In 1878 the legislature passed "An act to reorganize and change the name of the Ohio Agricultural and Mechanical College and to repeal certain acts therein mentioned." The act provided that the institution should be thereafter designated as "The Ohio State University." Up to this time but one appropriation had been made by the State for the support of the institution. With the reorganization came the larger and broader view of the State's relation to public education and since that time the Ohio State University has shared with other public educational institutions a more generous support by the State.

The governing body of the institution is a Board of Trustees, appointed by the Governor of the State and confirmed by the Senate, for terms of seven years, as provided in the law organizing the University. The original endowment has been supplemented, and the objects of the University promoted, by a permanent annual grant from the United States, under an act of 1890, by special appropriations of the General Assembly; and in 1891, by a permanent annual grant from the State, which grant was doubled by the legislature of 1896. In accordance with the spirit of the law under which it is organized, the University aims to furnish

ample facilities for education in the liberal and industrial arts, the sciences and the languages, and for thorough technical and professional study of agriculture, engineering in its various departments, veterinary medicine, pharmacy and law. Through the aid which has been received from the United States and from the State it is enabled to offer its privileges, with a slight charge for incidental expenses, to all persons of either sex who are qualified for admission.

LOCATION OF THE UNIVERSITY

The University is situated within the corporate limits of the City of Columbus, two miles north of the Union Depot and about three miles from the State Capitol. The University grounds consist of three hundred and forty-five acres, bounded east and west by High Street and the Olentangy river, respectively. The western portion, about 235 acres, is devoted to agricultural and horticultural purposes, and is under the management of the College of Agriculture and Domestic Science, The eastern portion is occupied by the principal University buildings, campus, athletic and drill grounds, a park-like meadow, and a few acres of primitive forest.

The grounds are laid out with care, ornamented with trees, shrubs and flower beds; and are so managed as to illustrate the instruction in Botany, Horticulture, Forestry, Landscape Gardening and Floriculture.

The University may be reached by either the North High street or the Neil avenue electric cars. Those wishing to go to the principal buildings of the University, to the residences on the grounds, or the Athletic field, should take a High street car going north. Those wishing to visit the Emerson McMillin Observatory, the Veterinary Hospital, Townsend Hall, Horticultural Hall and the Dormitories, will find the Neil avenue cars more convenient.

The University has thirteen buildings devoted to instruction, one Boiler House, one Power House, two Dormitories, six residences and some farm buildings. These buildings represent an investment for construction of about eight hundred thousand dollars. The equipment and apparatus amount to about one hundred and seventy thousand dollars. The land now occupied as a site with the farm is valued at one million five hundred thousand dollars.

BUILDINGS

University Hall contains the Executive offices, the office of the Secretary of the Trustees, the assembly room (seating twelve hundred persons), four halls for literary societies, the Y. M. C. A. and King's Daughters' room, the Young Woman's League room and class rooms and laboratories for the departments of Economics, English Literature, German, Greek, History, Latin, Mathematics, Pedagogy, Political Science, Philosophy, Physics, Rhetoric and English Language, and Romance Languages. An electric passenger elevator connects all floors.

Mechanical Hall contains a room fitted up with cases for the care of models, instruments of precision, etc.; a room for instruction in laboratory mechanics and draughting, and laboratories with the engines, hydraulic plant, testing machines, etc.

Botanical Hall has on the first floor the lecture room of the department of Botany. There are also an office, a store room, a dark room, and a private laboratory for Physiological Botany. On the second floor is the botanical museum, the main laboratory and the assistant's laboratory. Connected with this building is a large greenhouse and propagating-house.

Electrical Hall devotes the first floor to the dynamo room. The floor of this room is of asphalt, laid on a solid concrete foundation. On the second floor

are a lecture and draughting room, a photometric room, a library room, and office, stock and locker rooms.

Chemical Hall is now occupied by the departments of Chemistry, Mining and Metallurgy and Pharmacy. The department of Chemistry occupies the middle portion of the first floor and the middle and western portion of the second floor. The main lecture room has a seating capacity for one hundred and fifty students. The laboratory for introductory work and qualitative analysis has accommodation for two hundred and sixty-four students. There is also a special laboratory for qualitative analysis with accommodations for twenty-five students. The main quantitative laboratory accommodates fifty students. There is also an organic laboratory, a room for the preparation of experiments, a balcony accessible both from the lecture room and preparation room, a room for combustion work, a dark room for spectroscopic work, in addition to a number of smaller rooms used for private laboratories.

The departments of Mining and Metallurgy occupy the east end of the building In the basement are the smelting furnaces, the assay laboratory, a room for rough work and store room for supplies. On the first floor is the lecture room of the professor of Metallurgy, with a seating capacity for forty; a laboratory with desks for sixteen students, a store room, a balance room, a private laboratory and an office. On the second floor is the lecture room of the associate professor of Mine Engineering, a draughting room, a room for instruments and an office.

The department of Pharmacy occupies the first floor and basement in the west end of the building, and has a lecture room provided for sixty students; a preparation room, a laboratory with desks for twenty-five students; a room for supplies, a balance room, a model drug store and a private laboratory.

Orton Hall is designed for the permanent accommodation of the large geological collection of the University and for work and instruction in the department of Geology. A portion of it is occupied by the library and reading room. The building is two stories in height, with a high basement, is built of brick and faced with sandstone, and is fireproof throughout. At the right of the main entrance is the geological lecture room and professor's private room; at the left is the University library, reading room and librarian's private room. The central and rear portion is occupied by the geological and paleontological museums. The petrographical laboratory is located on the second floor. In the basement a room is used for work in geographical modeling, the finished models being afterward placed in the collection of such models in a room set apart for the purpose on the second floor. The basement accommodates also the museum of economic geology. A paleontological laboratory or working room is also provided on the second floor.

The greater part of the basement of Orton Hall is occupied as a laboratory by the department of Clay-working and Ceramics. This department is also accommodated with a large room on the first floor for recitation and exhibition purposes. In the rear of Orton Hall is a small brick structure used for the kilns of this department.

Hayes Hall is devoted to instruction in Industrial Arts, Drawing, Civil Engineering and Domestic Economy. On the first floor are two offices, the rooms of the department of Domestic Economy and two lecture rooms, the machine shop, the forge shop and the foundry. On the second floor are the carpenter and pattern shops and six large lecture rooms, with private rooms annexed.

The department of Drawing occupies the third floor for instruction in mechanical drawing and free-hand drawing and photography.

Horticultural Hall contains recitation rooms and indoor laboratories of the department of Horticulture and Forestry. An extensive greenhouse is attached.

The Veterinary Hospital contains on the first floor a veterinary museum and library, a dispensary and two private rooms for the persons in charge. On the second floor are a class room, a bacteriological laboratory and a microscopical laboratory. The rear extension contains an operating hall and a room provided with stalls, cages, etc., for the care of animals under treatment.

The Emerson McMillin Observatory is the gift of Mr. Emerson McMillin of New York. The first floor is divided by a hall and stairway into two parts. The east wing contains an office, library, clock room and a large, well-lighted room for the students, furnished with tables, where they reduce their observations and keep the records of their work. The west wing contains the transit house, the dome and photographic dark room. The transit house is a light frame structure, so designed as to be kept as free as possible from heat radiated by any heavy walls of masonry. The dome is a wooden frame-work, covered on the outside with canvas. The rest of the building is of pressed brick, the foundation and second story being "rock-faced."

The equipment consists of a twelve-inch equatorial telescope, mounting by Messrs. Warner & Swasey, objective by Mr. Brashear, with a large and powerful spectroscope by Mr. Brashear. This instrument is adapted to use either one or two prisms or a grating, and is provided with a double set of objectives, one corrected for the visual and one for the photographic rays; a positive micrometer with a seven-inch circle by Messrs. Warner & Swasey; a combined zenith telescope and transit instrument of three inches clear aperture by Mr. G. N. Saegmüller; a sidereal clock by Clemens Riefler of Munich; a comparator by Carl Ziliss; a four inch portable equatorial by Alvan Clark; a chronograph by Warner & Swasey; sextants, chronometers, meteorological instruments, etc. In addition to the above, Mr. McMillin's gift provides for an excellent astronomical library.

Townsend Hall is devoted exclusively to the instruction given in the College of Agriculture.

On the left of the entrance is the office of the Department of Agriculture and a private office, a stenographer's room and fireproof vault. Connected with the office on the south is an assistant's room, opening into a laboratory for advanced students. At the extreme south end of this floor is a large laboratory for student-work in soils and farm crops. Connected with this laboratory is a balance room, a store room and an instructor's laboratory. On the west side of the main corridor, and connected with the instructor's room, is a large class room opening into a preparation room with a dark room. This class room is fitted with all appliances for showing lantern slides of livestock, buildings, machinery, etc. On the same side of the corridor, and on the right of the stairway leading to the basement and second floor, are the class room and instructor's room for dairying. On the right of the main entrance is the department reading room. The north end of this floor is occupied by the museum with an attendant's room.

The north end of the high basement is occupied by the dairy department. This consists of a receiving room, a pasteurizing room, a store room, a refrigerator room, a lavatory, butter-making room, cheese-making room, two cheese-curing rooms and an instructor's room.

In the south end of the basement is a livestock room about forty feet square. One third of this room is occupied by raised seats, the remaining floor space being used for exhibiting and judging livestock. Connected with this is a room fitted with stalls for the temporary accommodation of livestock when needed for class exercises. The basement also contains soil storage room, bath room, toilet rooms, repair shop, locker rooms, bicycle room and janitor's room. A small detached building will furnish steam and power for the dairy department. Detached from the main building, but connected with the soil storage room by a

tramway, is a glass house for the study of soils and the experimental growth of plants.

The north end of the second story contains a large student laboratory for the department of Agricultural Chemistry, connected with an organic and analysis laboratory, a balance room, a store room and a private laboratory. The lecture room of this department is at the south end of this floor and will seat one hundred and sixty students on raised seats, with a preparation room adjoining. There is also in this floor a class room connecting with preparation room, store room and instructor's room, which is used (temporarily) by the department of Veterinary Medicine. There is also an extra class room, ladies' toilet and locker rooms and a hall for the use of the Townsend Society, designed to seat about two hundred persons.

Biological Hall is designed for the special accommodation of the departments of Entomology, Zoology, Anatomy and Physiology, and is fully equipped with all the latest and best apparatus for this work. It consists of a basement, in which is done all the work of preparation of subjects for the lecture tables and for the special laboratory work for the advanced students; the first floor, on which are lecture rooms, general and special laboratories, and private work rooms for the professor of Entomology and Zoology and his assistants; the second floor, similarly arranged for the work in Anatomy and Physiology; and a large wing, in which is the museum and a large lecture room. The building is fireproof throughout, and in design and general appearance is one of the most attractive on the campus.

The Gymnasium and Armory was first occupied in January, 1898. The drill hall and gymnasium floor is eighty feet wide by one hundred and fifty feet long. The roof is carried on curved steel arches, lighted from a clear story at the top. There is a running track around the entire room about twelve feet from the floor, back of which is a visitors' gallery seating about seven hundred persons. At the northwest corner of the floor is a stairway leading down to the men's locker and dressing room, while the young women go down a similar way at the southeast corner to their rooms. On the levtl with the main floor, near the main entrance at the south, is a large room for the use of the Commandant and his classes and rooms for the Director of the Gymnasium. Above the Commandant's room is the room for the officers of the University Cadet Corps.

The basement is very high and well lighted. On the young men's side are dressing and locker rooms, the bath room with shower and plunge baths, a bicycle room, a lecture room, the cannon room, the band room, and a large room, which is to be the home of the University Athletic Association. On the young women's side are the locker rooms and bath rooms—precisely like those provided for the young men—a bicycle room, lecture room and private office for the instruction in sanitation and hygiene for young women.

The North Dormitory is situated at the northern limit of Neil avenue, and fronts Eleventh avenue. It is at the terminus of the Neil avenue electric car line. It is a plain structure of brick, and affords accommodation for sixty-four students.

The South Dormitory stands near Neil avenue within a few rods of the North Dormitory. It is also built of brick, and contains rooms for twenty students.

Residences. There are seven dwelling houses upon the University campus. Five of these are brick and two are frame structures. One is occupied by the President of the University, five by professors, and the seventh is the farm house.

ORGANIZATION OF THE UNIVERSITY

The Ohio State University is divided into six colleges, as follows:

The College of Agriculture and Domestic Science consists of those departments represented in the course leading to the degrees of Bachelor of Science in Agriculture, Bachelor of Science in Horticulture and Forestry and Bachelor of Science in Domestic Economy, and in the Course in Dairying.

The College of Arts, Philosophy and Science consists of those departments represented in the courses leading to the degree of Bachelor of Arts, Bachelor of Philosophy, and Bachelor of Science; and in the Courses Preparatory to Law and to Journalism.

The College of Engineering consists of those departments represented in the courses leading to the degrees of Civil Engineer, Engineer of Mines, Engineer of Mines in Ceramics, Mechanical Engineer, Mechanical Engineer in Electrical Engineering, and Bachelor of Science in Industrial Arts, Bachelor of Science in Chemistry or in Metallurgy; in the Course in Architecture, in the Short Course in Clay-Working and Ceramics, and in the Short Course in Mining.

The College of Law consists of those departments represented in the course leading to the degree of Bachelor of Laws.

The College of Pharmacy consists of those departments represented in the courses leading to the degree of Bachelor of Science in Pharmacy, and in the Short Course in Pharmacy.

The College of Veterinary Medicine consists of those departments represented in the course leading to the degree of Doctor of Veterinary Medicine, and to a certificate of Veterinary Surgeon.

Each college is under the direction of its own Faculty, which has power to act in all matters pertaining to the work of students in that college.

LABORATORIES AND EQUIPMENT

AGRICULTURE

The equipment of this department may be divided along three general lines: the plant, the museum and the illustrative materials.

The Plant. This consists of a farm of about two hundred acres, a general farm barn, a horse barn, and several smaller buildings. The farm lies along the Olentangy river, and includes both first and second bottom land. On this farm are grown general farm crops in the rotation deemed best suited to the circumstances of the Department. At present a few experiments are conducted, the general idea being to conduct such experiments as will have the largest instructional value to the students who attend the College of Agriculture. The Ohio Agricultural Experiment Station continues to conduct here the elaborate fertilizer experiments with wheat, corn and oats, which it has been making on this farm during the past five years. Different species and varieties of farm crops are grown to some extent for the purpose of class illustration and instruction, and it is expected to enlarge this feature.

Specimens of the draft, coach and roadster type of horse are kept and used in the farm work. The Department manages a milk dairy; having a herd of about forty cows, composed of pure bred and grade Jerseys and Shorthorns.

The general farm barn contains a well arranged stable for forty cows, with underground drainage and sewage cistern, a milk cooling room, a silo, a roof cellar, a work-shop, with room for hay, grain and other foodstuffs.

The Museum. This contains a large number of samples of farm products in various forms and their by-products, such as soils, grains, grasses, wools, cotton,

forage plants and foodstuff. Milling and other processes are illustrated by samples of the various products of manufacture.

The museum contains Auzoux models, samples of tools and a considerable miscellaneous collection. The collections are intended primarily for student use and not for display.

ILLUSTRATIVE MATERIALS. These consist of charts, pictures and lantern slides showing results of experiments, representative and noted specimens of livestock, farm machinery, fences, buildings, etc. The Department has and uses constantly in the class room a Beseler double oxygen–ether stereopticon. The collection of several hundred lantern slides for this purpose is constantly receiving additions.

THE AGRICULTURAL LIBRARY. While not considered as belonging specifically to this Department, there is in the general library a fairly good collection of books and periodicals devoted to agriculture, a large use of which is required of the student.

THE LABORATORY OF SOIL PHYSICS is located on the second floor of Horticultural Hall, and is supplied with apparatus for the mechanical analysis of soils and for testing their physical properties. (*See also* BUILDINGS — *Townshend Hall.*)

ARCHITECTURE

This work is carried on in connection with the Department of Drawing. The facilities for this work consist of a large, well–lighted drawing–room for the designing and drawing part of the work, a recitation room specially fitted with stereopticon lantern to illustrate the lectures, several hundred lantern slides of typical specimens of architecture from all parts of the world, a collection of scale design drawings, a collection of specifications of buildings that have been erected, a collection of plaster ornaments used in architectural decoration and a well selected collection of useful books in the library. The City contains many buildings of interest to the architectural student, both in a completed state and in process of erection.

BOTANY

The general Botanical Laboratory occupies a part of the second floor of Botanical Hall. It is 23x33 feet, and is furnished with both movable and fixed tables. The latter are attached to the west and south walls near windows, suitably shaded. Water, gas and an evaporating hood are also provided. The laboratory is equipped with compound microscopes of the Baush and Lomb, the Leitz and other patterns; and accompanying each is a tray of tools and a case of reagents. There are more than fifty dissecting microscopes, also charts, and several minor pieces of apparatus for experiments in vegetable physiology. Three smaller rooms are also provided as laboratories for special work, as well as a dark room for photography. Other facilities for the illustration of the courses in botany, and for practical training in the same, are: A general herbarium, including flowering plants, ferns, mosses, fungi and algae; a state herbarium, a collection of fruits and seeds, valuable timbers, woods, grasses and various economic products of the vegetable kingdom; ornamental grounds and woodland, planted with a large variety of evergreen and deciduous trees and shrubs; and a greenhouse with a fair collection of native and exotic plants. (See also MUSEUM — *The Botanical Museum;* and BUILDINGS—*Botanical Hall.*)

CHEMISTRY

The laboratories of the department accommodate from three to four hundred students. Each laboratory is equipped with all the necessary conveniences as water, gas, electric lights, distilled water piped from a large still in the attic,

steam ovens, automatic air blasts, suction pumps, etc. The department is liberally supplied with the best apparatus and materials for both lecture room and laboratory work. Each student has his own desk with drawers and locker. All supplies are procured from the chemical store room which has always on hand a complete stock of all necessary materials. (See also BUILDINGS — *Chemical Hall.*)

CIVIL ENGINEERING

The facilities provided for the illustration of the courses in civil engineering and for practical training are as follows: One high grade and three ordinary transits, four leveling instruments, solar compass, prismatic compass, improved telescope compass, Abney hand level, level and stadia rods, sight poles, chains, tapes; twenty-six improved drawing tables with 30″ by 36″ top; Schroeder's models in stereotomy of roof trusses; large set of models of wooden joints; collection of photographs of bridges, both when finished and in course of erection; collections of strain sheets and shop drawings of bridges; new improved cement testing machines and outfit for making all kinds of cement tests; stone mason tools for working models out of plaster blocks; magic lantern and slides; collections of samples of building materials; calculating machines; sets of drawing instruments; blue print room with outfit; sets of tracings of standard structures from which each student may make a set of blue prints. The equipment is growing each year by the addition of materials purchased, presented, or made by students of the Department.

CLAY-WORKING AND CERAMICS

The University is the first, and at this time the only institution in the United States offering special facilities for the study of clays, clay-working, and the chemical technology of the ceramic art. The facilities of the Department comprise: 1st. A convenient chemical laboratory, specially designed and equipped for the analysis and decomposition of silicates. Provision has been made for the use of hydrofluoric acid with safety, and the platinum ware has been made to order with this purpose in view. 2d. A complete mechanical outfit for the preparation of clays for pottery manufacture and the production of the ware itself, of any grade from earthen wares to porcelain. The machinery is of the latest types and comprises all important varieties in use for grinding, tempering, washing, filtering and molding. 3d. A similar plant for the manufacture of brick, tiles, pipes and hollow goods. The machinery here is of full size and samples up to a ton in weight can be received and transformed into the finished article by any or all of the standard methods in commercial use. The power for this purpose is derived from a fine electric motor, driven from the University power plant. 4th. A kiln house, equipped with a kiln in which several hundred bricks, or an equivalent quantity of sewer-pipe, stoneware, or pottery can be burnt. The fuel is intended to be coke, except in special cases where the fuel available for burning clay wares is to be made the subject of test. There is also provided a crucible melting furnace and a muffle furnace for testing glazes. A muffle kiln of large size for burning pottery, glazed ware and decorated wares has recently been put into operation. 5th. A ceramic museum, containing a fine collection of American pottery and clay products of every class, is in process of installation. 6th. A library of the best literature on the subject, mainly German but containing a few English and French works, and the trade periodicals. (See also BUILDINGS—*Orton Hall.*)

DOMESTIC ECONOMY

The Department of Domestic Economy (for young women) will secure for the course all that experience and observation may suggest. At present it has a large

kitchen, with dining room adjoining, each fitted with the latest and best appliances for the work undertaken. About a thousand dollars has been expended to make this department entirely practical, and to permit its instruction to be as thorough and as scientific as that of any other department in the University.

DRAWING

The Department occupies the entire third floor and one room in the basement of Hayes Hall, and is provided with the following equipment for the illustration of the work in drawing and for the practical training in same:

For freehand drawing, water color and oil painting:—A large studio thirty–five by eighty feet, specially arranged and provided with adjustable tilting tables and easels, a well selected collection of pencil, pen and ink, charcoal and color specimens of work, wooden models of geometric forms, plaster–casts of ornaments, flowers, fruit and the antique.

For clay–modeling:—A specially arranged and equipped studio twenty–six by thirty–two feet for modeling in clay and casting in plaster, consisting of modeling stands, moisture box, casting table, modeling tools of wood and steel, stove and vent–hood for the preparation of gelatine molds and lockers.

For mechanical drawing and mechanical and architectural designing:—A large, well lighted room forty by eighty–five feet, provided with O. S. U. drawing tables (30″ by 36″ tops), a set of Schroeder models, a collection of shop drawings and facilities for blue–printing.

For photography:—A well arranged and equipped dark–room, printing apparatus, copying camera, six view cameras, lenses of long and short focus, telephotographic lens, shutters for instantaneous exposures and an excellent outfit for photo–micrography.

In addition to the above, the library contains a well selected collection of books pertaining to the work of the Departments. (See also BUILDINGS—*Hayes Hall.*)

ECONOMICS AND SOCIOLOGY

The University, through the efforts and generosity of its friends, is possessed of a unique equipment for study purposes in these lines. This equipment comprises a large collection of railroad, municipal and school bonds; of stocks of all kinds; of letters of credit, drafts, foreign bills of exchange, bills of lading, checks, enclosures, statements, insurance policies, trust certificates, notes, mortgages and all the necessary forms of business paper; also collections of coins illustrative of various periods in our monetary history, foreign coins, and scrip; also sets of maps and charts and a Kiepert–Commercial Globe 80 cent. in diameter. Ample facilities for statistical work are provided and a seminary room set apart for the use of laboratory material, documents, etc., is always open to advanced students. It is the policy of the Department to make the statistical investigations and research work of advanced students contributory to the permanent equipment of the Department, thus enriching the facilities from year to year with material of scientific and pedagogical value.

ELECTRICAL ENGINEERING

The Electrical Laboratory affords very good facilities for practical experimental work with dynamo machinery and other electrical apparatus. The dynamo equipment consists of twenty–five machines of various makes and sizes from 40 H. P. down; aggregating over 200 horse power. These include direct and alternating current generators, polyphase motors, arc and incandescent lighting generators, railway and station motors and unipolar dynamo. The latter, with an alter–

nating current generator and a 2–phase motor, were built by the students; it being the policy of the Department to build as much of its apparatus as possible. There are also a number of transformers of different makes, including one for welding,—built at the University. Arc lamps of different styles, a 10–kilowatt–hour storage battery, condensers and resistances, and magnetic testing apparatus also form part of the equipment. The list of measuring instruments is quite complete, and includes a standard Weston voltmeter and eleven other Weston volt and am–meters, also four Kelvin static voltmeters, five dynamo–meters, one watt–meter, three galvanometers and a dozen other am–meters and voltmeters of different makes. A telephone laboratory—with apparatus for comparative tests, a variety of transmitters and receivers, and lines running to another building, has been in use for two years. Photometry is given at present in the Physical Laboratory, where the equipment in this line is excellent. Power for running the dynamo laboratory is supplied by three induction motors from the University Power Plant. This latter is a model 2–phase plant, and the electrical part of it has been for the most part installed by the students of the Department. The repair and maintenance of this plant is done by the students, who receive compensation for the time so spent.

GEOLOGY

The University is able to present unusual advantages for the study of Geology. By an act of the Legislature it has been put in possession of all the collections made by the late Geological Survey, and these collections have been supplemented by valuable additions of fossils and minerals from various sources. The State collection embraces a very complete representation of every geological formation shown in Ohio. In its new and ample quarters the Department offers exceptionally good opportunities for work in the lithological, petrographical and modeling laboratories. (See also MUSEUMS—*the Geological Museum*; and BUILDINGS—*Orton Hall.*)

HORTICULTURE AND FORESTRY

Among the facilities provided for the illustration of the courses in horticulture, and for practical training in the same, are: (1) a collection of horticultural tools for budding, grafting, pruning, etc.; (2) an orchard, containing well–selected varieties of the apple, pear, cherry, plum and quince; (3) a small vineyard, containing numerous varieties of the grape; (4) a garden of small fruits, containing all the best varieties of the strawberry, raspberry, blackberry, currant and gooseberry; (5) a vegetable garden, with forcing houses, cold frames, experimental plats, conveniences for irrigation, etc.; (6) small nursery and forest tree plantations, with practice rows of budding, grafting, pruning and training; (7) ornamental grounds and woodland, planted with a large variety of evergreen and deciduous trees and shrubs; (8) a greenhouse, with a fair collection of native and exotic plants; (9) a collection of preserved natural specimens, and models of fruits, seeds, woods, etc.; (10) a laboratory fairly well equipped with balances, charts and other appliances for study and research. (See also MUSEUMS—*the Botanical Museum;* and BUILDINGS—*Horticultural Hall.*)

MECHANICAL ENGINEERING

The greater part of Mechanical Hall is devoted to laboratory purposes.

The south laboratory is used for applied mechanics and for gas engineering. Here are located the machines for testing the strength and elasticity of engineering materials, and recording their physical properties automatically and autographically. Oils are tested as illuminants and as lubricants. Belts and pulleys are tested for their slippage, friction and horse–power transmitted. The gas engine plant has three engines, representing gas and gasoline, three methods

of ignition, and fly ball and inertia governors. The air is supplied by a fan through a large meter. Temperatures and pressures of air, gas and water are measured. The fresh and burnt gases are analyzed and their heating values determined by a calorimeter. The power is measured at both the indicator and the brake. The laboratory machine shop and tool room are in this room.

The north laboratory is used as a steam engineering and hydraulic laboratory. Four 35-horse-power engines give facilities for testing single and duplex condensing or non-condensing, simple or compound, throttling or automatic cut-off engines, using either a jet or a surface condenser. Pressure and vacuum guages are calibrated. Indicator springs of five makers are tested either cold or hot. Five kinds of calorimeters determine the moisture in steam before and after passing three different separators. Injectors are tested for lift, quantity, pressure and steam consumption. Steam pumps of six makes, ranging to 800 gallons per minute capacity; two centrifugal and a rotary pump, enable tests of pumps to be made and deliver water at pressures below 150 pounds to two stand-pipes, which in turn supply turbine and cascade, and Pelton water wheels, and enable experiments to be made on the flow of water through orifices, pipes, valves, etc. Three cisterns, provided with a variety of weirs up to five feet wide, give practice in measuring flowing water. A Venturi meter and a Pilot tube are also used. Ericsson and Rider hot air engines are tested. A Rife hydraulic engine, a Humphreys ram, Gem and Eureka water motors, and a pulsometer, are included in the hydraulic apparatus, all of which are connected and prepared for complete tests.

A complete set of Westinghouse air-brake apparatus, a blower and a ventilating fan, enable experiments to be performed in the flow of air. They are supplemented by tests of the heating and ventilating plants in the buildings of the campus.

In addition to the apparatus and equipment of the power plant of the University the power house at Townshend Hall contains a horizontal, return tubular boiler, two steam engines and an ammonia refrigerating machine, making the facilities on the campus for testing quite complete. Machinery, apparatus and appliances are continually being presented, built or purchased, and the student is given an opportunity to test everything under practical conditions of operation. Besides the laboratory facilities, opportunities frequently arise to test machinery, engines or boilers in the city, and in these tests the students take part.

METALLURGY

The metallurgical laboratory has all the appliances for the most modern methods of technical analysis as practiced in iron and steel laboratories, including gas analysis. A furnace room in the basement is fitted for gold and silver assaying, with improved muffle and crucible furnaces.

The lecture room in metallurgy has arrangements for projecting photographs of machines, mines and furnaces, for class illustration, and there is a large collection of such views. There is a photographic room with blue-printing facilities, where students learn to make copies of the drawings used in illustrating the lectures.

A collection of minerals and rocks with a large set of rock sections is provided for illustrating the mineralogy, as well as sets of blow-pipe apparatus for the students in determining mineralogy. (See also BUILDINGS—*Chemical Hall;* and MUSEUMS—*The Geological Museum.*)

MINE ENGINEERING

The Department is equipped with all of the latest improved instruments and apparatus used in mine engineering, surveying and the study of mine ventilation.

There is a collection of models of mine machinery and supplies, to which additions are being made which are valuable as illustrations. The draughting room is large, well lighted and provided with a desk for each student, where he is personally taught map making and the platting of actual surface and underground surveys; the making of tracings of drawings and how to make blue-prints. He is also taught the proper methods of keeping notes and all records necessary to an efficient engineers' office. The students are given practical experience by making actual surveys of coal mines and in working up their notes complete in all of the necessary details. The students are also taught how to make working drawings, plans, estimates and specifications of mining operations and equipment.

The lecture room has arrangements for projecting photographs of machines, mines and mine equipment, for class illustration, and there is a collection of such views. Also photographic room with blue-printing facilities, where students learn to make copies of the drawings made by themselves and those used in illustrating the lectures.

PHARMACY

The facilities provided for illustration of this work and for practical training are as follows: The apartments assigned to this work occupy the west end of the Chemical Hall, first floor and basement. The lecture room will accommodate sixty students, and is provided with a large lecture table and supplied with gas and water, and other conveniences for experiment. About the walls are arranged cases in which are exhibited rare and costly chemicals, curious drugs, and high-grade pharmaceuticals. Adjoining this room is the preparation room and storeroom, where the supplies and apparatus and material are kept, and where the apparatus for experiment and illustration before classes is prepared. Also adjoining this room is the professor's private laboratory. The main laboratory has desks for thirty-five students, each one provided with gas and water, and sufficient storage space for material and apparatus. The laboratory is furnished with apparatus for distilling, and reclaiming, with mills, balances, drying closets, steam vaporizers, hoods and other special apparatus for pharmaceutical work. Opening into the laboratory is the drug store. This drug store is complete, and is in itself a cabinet of official drugs, and all preparations thereof. It is provided with a prescription desk and all apparatus adapted for training in prescription work. Adjoining the laboratory is the reading room, where are kept the various pharmaceutical journals, the dispensatories, and many books of reference. Also adjoining the main laboratory is the balance room, which is well provided with analytical balances, specific gravity balances and microscope, all of which are intended for higher pharmaceutical work.

In the reading room is also a cabinet of crude drugs, which have been classified and numbered but bear no name. This cabinet is adapted to the study of pharmacognosy.

In addition to the foregoing equipment, the Department is possessed of an extensive range of apparatus, by means of which any branch of work in pharmacy can be successfully pursued. The Department is complete in all its details, and affords unexcelled opportunity for the study of pharmacy. (See also BUILDINGS—*Chemical Hall.*)

PHYSICS

The Department has an excellent equipment of apparatus, to which additions are constantly being made. The apparatus includes a large collection of pieces for illustration of the general lecture room work, but is principally chosen for accurate measurement in the laboratory. A set of standards of length, capacity and mass, sent under the act of Congress supplying such sets to the several agricultural

colleges, is in the possession of the Department. The pieces are copies of the United States standards made by the Coast Survey at Washington.

Among the principal pieces of apparatus are a dividing machine by Fauth & Co.; chronometers by Parkinson & Frodsham and by Negus, the latter a break-circuit; a chronograph by Fauth & Co.; a Hipp's chronoscope; cathetometers by Salleron and by the Geneva Society, the latter an exceptionally fine instrument; Regnault's apparatus for vapor tension, for expansion of gases and for specific heat; Melloni-Tyndall apparatus for radiant heat; standard thermometers by Baudin and others; Rutherford and Rowland, different gratings; Rowland's spectrum photographs; spectroscopes by Brashear, Browning, Apps and others; Salleron's complete apparatus for projections in polarized light; lanterns for projections by the lime light and the arc light; a variety of sound apparatus from Koenig; portable and quadrant electrometers; Kelvin galvanometers of high and low resistance; Weidemann, Kohlrausch and other galvanometers; standard resistance coils, with Cavendish laboratory certificate; several sets of resistance coils and bridges; a Kew magnetometer; Kelvin standard balances; Weston ammeters and voltmeters; standards of self-induction; standard battery cells; photometric standards and photometers; X-ray apparatus, etc.

Under the laws of Ohio, the professor of physics is *ex officio* State Sealer of Weights and Measures, and all of the standard weights, measures and balances received from the United States government are in the rooms of the Department.

PSYCHOLOGY

The facilities provided for the study of anatomy, bacteriology, histology and physiology are excellent. The laboratory is supplied with skeletons, papier-mache manikin, and many models, including models of the eye, ear, larynx, etc. The apparatus of the Department for work in bacteriology and physiology is of the best and most approved construction, and is adapted to the accurate investigation of bacterial forms, as well as to the thorough performance of the fundamental physiological experiments. Myographs, spectroscopes, microscopes and the necessary chemical outfit are also provided. For work in histology the equipment includes twenty-four individual tables for student experiments, each table being supplied with a good microscope, microscopical accessories, microscopical reagents; and for advanced work, the needed apparatus for instruction in the various methods of hardening, staining, imbedding, section-cutting and injection. The laboratory also has excellent microtomes, imbedding baths and other essentials of a histological outfit. The equipment of the laboratory makes it possible to offer a large range of work for the choice of students in advanced courses. (See also BUILDINGS—*Biological Hall.*)

PSYCHOLOGY AND EDUCATION

The psychological laboratory occupies three rooms on the fourth floor of University Hall and is reasonably well equipped for work in physiological and experimental psychology and for research in related educational lines. For the study of motor processes and development the most improved form of ergograph with complete sets of myographic, chronographic, dyamometric and pneumatic recording appliances, has been provided. A complete outfit of apparatus for the study of sensation, memory and association make it possible for students of education to acquire methods of exact observation of the various mental and motor processes involved in school work. Provision has also been made for work in comparative psychology.

SHOPWORK

The shops, which occupy the north wing of Hayes Hall, afford excellent facilities for instruction in both the practical details and the underlying principles of carpentry, pattern–making, forging, moulding, foundry work and machine work.

The carpenter and pattern shop is equipped with twenty–five benches with complete sets of carpenter tools for each and a large number of special tools for general use, twenty–three pattern–makers' turning lathes with cupboards containing the necessary turning and pattern–making tools under each, a pony planer, a buzz–planer, a circular rip and cross–cut saw, a scroll saw, a trimmer and a power grindstone.

The forge shop is equipped with twenty stationary forges with anvils and tools for each, a heating forge, a portable hand forge, a foot–power hammer, a blacksmith's drill and a punch, shear and bar cutter. The blast for the forges is furnished through underground piping by a 45″ Buffalo pressure blower, and the smoke is removed by a 55″ Buffalo exhaust fan overhead. Both of these fans are driven by a 15–horse–power electric motor.

The foundry is equipped with a 24″ Calliau cupola, the blast for which is furnished by a 30″ Buffalo blower; two brass furnaces, one 16 inches in diameter and the other 20 inches in diameter; a core oven, benches for iron and brass moulding, core making and cleaning of castings, a space for floor moulding 30 feet by 40 feet, besides all the necessary moulding tools, flasks, crucibles, ladles, tongs, etc.

The machine shop is driven by a 30–horse–power electric motor from above, and is equipped with the following tools: Twenty–eight benches for vise work with complete sets of tools, eight speed lathes, sixteen engine lathes, two planers, two shapers, a milling machine, an upright drill, a sensitive drill, grinding machines for both plane and cylindrical surfaces, tool grinders, emery wheels, etc. This machinery is furnished with all the necessary tools, and the tool room is equipped with full sets of drills, taps, dies, milling cutters, standard plugs, gauges, threads, etc., micrometers and a great variety of special tools. (See also BUILDINGS—*Hayes Hall.*)

VETERINARY MEDICINE

The Veterinary Hospital affords excellent facilities for the treatment and care of animal patients, and also gives the students the opportunity to become practically familiar with the diseases to which our domesticated animals are subject. It contains box stalls, stalls for cold water applications, a large and well lighted operating hall and a special ward for dogs. The front part of the Hospital contains a lecture room, a museum of anatomical and pathological preparations, a drug dispensary and an office. In the museum are skeletons of the horse and ox, a complete manikin of the horse, papier–mache models of various anatomical parts, pathological specimens preserved in alcohol, etc.

In the library are choice collections of works in veterinary medicine and allied sciences and also copies of the leading veterinary periodicals.

The College is well equipped for surgical work. Instruments of the latest and most approved makes are kept in the instrument room for use in operations.

In the daily clinics not only are horses and dogs presented, but also the meat–producing animals from the barn, near the College.

The bacteriological laboratory in the biological department is supplied with apparatus of the most modern and improved construction, the microscopic appliances being adapted to the most accurate work in bacteriology. (See also BUILDINGS—*The Veterinary Hospital, Biological Hall.*)

ZOOLOGY AND ENTOMOLOGY

Instruction in this department is largely by the laboratory method with lectures and use of text or reference books, the effort being to lead the student to observe and think for himself. The various courses are intended to provide instruction in the elements of the science, familiarity with methods of study and investigation, and opportunity for special research involving field, laboratory, museum and library work. The adjacent fields, wood, lake and river; the various well equipped laboratories, extensive collections and libraries furnish excellent opportunities for every phase of the study.

The Department occupies the first and third floors of the fine new Biological Hall providing two lecture rooms, one general and five special laboratories, museums, offices for professor and assistants, besides room for storage, workshops, aquaria, cold-storage, photography, etc. The laboratory equipment includes microscopes, microtomes, incubators, injectors, etc., for most approved methods of work in morphology, embryology and neurology. The collections include a fine series of skeletons, a number of large mammals, series of the birds of Ohio, of the birds of North America, of Ohio fishes, of mollusks and especially rich collections of insects particularly in Odonata Hemiptera and Diptera. (See also THE MUSEUMS—*The Zoological Museum, Biological Hall.*)

The Lake Laboratory maintained at Sandusky and open during the summer vacation offers courses of instruction and exceptional opportunities for original investigation in a very interesting and delightful locality. (See Lake Laboratory.)

THE LAKE LABORATORY

The University maintains a lake laboratory during the summer vacation at Sandusky where it occupies a convenient building, the former Hatchery building, 22x26 feet located by the city water works and close to the waters of the bay and convenient to good boarding places.

It has good facilities in the way of boats, tables, aquaria, collecting appliances, while microscopes, reagents, etc., are fully supplied from the home laboratory.

It offers for the coming season courses in botany and zoology outlined below, and also opportunities for special research in any branch of biology. The professors of the departments of Botany and Zoology and Entomolgy with their assistants will constitute the staff of instruction.

The courses will be open to students and teachers generally and students of the University may receive credit for courses equivalent to University courses.

Investigators engaged upon special problems relating to the fauna or flora of the region are given the privilege of the laboratory without charge but are expected to furnish their own microscopes or other special apparatus unless otherwise arranged. For the courses of instruction, a fee of twenty dollars will be charged which will cover all expense of instruction, laboratory supplies and use of boats and admit to two full courses of eight weeks.

COURSES IN ZOOLOGY

(a) Laboratory and field courses including dissection of type forms, aquaria and field studies with instruction in collecting and preparing material for laboratory use and permanent collections. Special attention will be devoted to fishes and their food supply.

(b) Advanced courses in Invertebrate Morphology or Embryology.

(c) Special courses in Entomology, field and laboratory work.

(d) Special course in Ichthyology devoted particularly to the lake fishes, their habits and food supplies.

COURSES IN BOTANY

(a) Laboratory and field courses including a study of type forms. The course will consist of collection trips in the field where the common species of each class are found, classification of familiar forms, study of structure and special parts of interest in connection with each group, with methods of preserving and mounting for immediate use or permanent preservation.

(b) General Botany consisting largely of Morphology and Ecology.

(c) Laboratory course; the work to be arranged.

For further information write for special circular on Lake Laboratory.

THE MUSEUMS

The Geological Museum of the University has been collected and arranged with reference to instruction rather than to display. The basis of it is a large and comprehensive collection of the rocks, fossils and economic minerals of Ohio. The collection embraces the following named series:

(a) An excellent representation of the leading divisions of the geological scale of the State, so far as it can be illustrated by rock specimens. The specimens represent the leading phases of each formation, and in many cases carry the characteristic fossils of the horizons from which they are derived.

(b) A collection of the animal and vegetable fossils of the rocks of Ohio. This series includes a large majority of the described fossils of our formation, and in the number are many type specimens. While all the ages of our geological history are well represented, the collection of the Upper Silurian and Devonian animal fossils is particularly rich and complete. A remarkably fine series of coal plants is also included in the museum. The list of fossils has been greatly extended in the number of species and individuals by the recent purchase of the collection of Mr. Henry Moores, of Columbus.

(c) The economic minerals of the State are also shown to excellent advantage in the museum. The coals, petroleums, iron ores, clay and building stones produced in Ohio are represented in large collections. Many of the specimens upon which chemical examinations or physical tests have been based in the work of the geological survey of the State are included here.

(d) Petrographical collections: These collections were selected with a view to their use in petrographical instruction, and embrace the Hawes collection, the Krantz collection and the Rosenbusch complete series of typical rock specimens from important centers abroad. These hand specimens are supplemented by two series of thin sections, including Voigt and Hochgesang's collections of typical rocks and of the petrographically important minerals.

In addition to the collections above described, the museum contains a great deal of valuable material in the line of general geology and mineralogy. Among other things it includes several valuable suites of ores and many fine mineral specimens.

There also belong to the museum a number of geological casts, models and maps. In this series are included a relief map of the State of Ohio, and also the models of the basins of the Atlantic ocean and Caribbean sea, prepared under the supervision of the United States Coast and Geodetic Survey.

The catalogue of the museum contains more than 10,000 entries; but as only one number is as a rule given to a fossil or a mineral species, the individual speci-

mens make an aggregate list of many thousands in addition to the catalogue list, and probably double this list.

The skeleton of a mastodon, one of the extinct elephants of Ohio, has recently been presented to the museum by N. S. Conway, of Catawba, O., on whose farm it was found. It has been mounted by Prof. H. A. Ward, of Rochester, N. Y., and proves to be one of the largest in the country.

The museum also has a mounted skeleton of *Megalonyx Jeffersonii*, one of the great ground sloths. This specimen has the distinction of being the first and thus far the only mounted skeleton of this animal in the world. The bones were discovered by Abraham Drushell and others in a swamp in Berlin township, in Holmes county, O., in 1890. They were mounted in Ward's Natural Science Establishment, Rochester, N. Y. The entire outlay involved in the purchase of the bones and in mounting them was borne by Mr. Emerson McMillin, of New York.

The Zoological Museum is located on the ground floor of the wing of Biological Hall. The foundations of a zoological museum have been laid and the work begun on a generous plan. Every effort is being made to secure and preserve excellent specimens in all groups of animals. Not only the adult animals are preserved but the preparatory stages as well, their work and architecture, in fact all that can illustrate the life-history and habits.

Among special features are the Wheaton collection of birds of Ohio, numbering about 1,000 skins; a collection of North American birds, about 1,500 skins, representing very fully the North American fauna; a number of fine specimens of larger mammals, moose, hippopotamus, deer, tiger, peccary, lion, tapir, etc., most of which have been generously donated by Sells Brothers; a collection of about 3,500 molluscan shells; a fine series of Ohio fishes; numerous reptiles, amphibians, etc.

There is an excellent series of skeletons, crania and alcoholic material for courses in comparative anatomy.

The collection of insects is being rapidly enlarged and the purchase of the Kellicott collection of Odonata makes it especially rich in that order.

Professor Osborne's private collection of Hemiptere is deposited in the Department and available to students for comparison and study.

The Botanical Museum occupies the second floor of Botanical Hall. It contains the University herbariums, both general and state, also Professor Kellerman's private herbarium of over 20,000 specimens deposited for use in the Botanical Department; a complete collection of the native woods of Ohio; a collection of the seeds and fruits of plants; a collection of native medicinal plants; a general collection of vegetable products, including seeds, textile fibres, coloring substances, etc., illustrating economic or applied botany.

The Agricultural Museum. For a description of this museum, see Buildings—*Townshend Hall.*

The Anatomical and Pathological Museum. For a description of this museum, see Laboratories and Equipment, Veterinary Medicine.

The Museum of Clay-Working and Ceramics is now in process of formation. Some excellent specimens of ceramic products have already been collected, and efforts are being made to increase the collection.

Archaeologic Collection. Orton Hall now contains the second best archæologic exhibit in the Ohio Valley, the total number of specimens owned by the Ohio State University, the Ohio State Historical and Archæological Society and by private individuals, amounting to 46,200. Although the Museum is but three years old, it has shown a remarkable growth.

Field work has been carried on in various parts of the State during the summers of 1894, 1895 and 1896, and as a result the contents of more than eighty

mounds, graves and village sites are now on exhibition. The chief exhibits, illustrating the life of ancient tribes are from Fort Ancient in Warren county, from the mound graves of the lower Scioto and from the Muskingum Valley. It is considered that in Ross county aboriginal culture reaches its highest development in the whole Ohio Valley. This fact is well attested by the presence of numerous copper objects, effigy pipes, fine ornaments and ceremonials, pottery, delicate work in polished stone and flint implements, etc.

The collection from the valley of Brush Creek and along the Ohio itself, and from the hill regions of Ohio, show a much lower grade of culture. Careful comparison of the work of man from these localities is exceedingly interesting.

There is an exhibit from Flint Ridge, illustrating the manufacture of arrow and spear heads. The Museum contains nearly 150 specimens of pottery from Missouri and Arkansas, many of which are effigies of animal, bird and human form.

The founders of the Archæologic Museum are arousing public interest in the preservation and study of Ohio antiquities; and by means of exchanges, lectures and personal solicitation, the growth of the collection is considerable.

LIBRARIES

THE UNIVERSITY LIBRARY

The University Library is located in the east end of Orton Hall. The system of department libraries prevails to a limited extent, small collections of books specially needed in connection with laboratory and class room work being deposited in several departments.

During term time the Library is open six days in the week, legal holidays being excepted. From Monday until Friday the hours are from 7:30 a. m. until 9:30 p. m.; Saturday from 7:30 a. m. until 4 p. m.

The management of the Library is vested in a Library Council which is composed of the President, the Librarian and the Deans of the six colleges.

STATE LIBRARIES

Students are privileged in being near the two State libraries.

The Ohio State Library numbers about 70,000 volumes and is a circulating one for all the citizens of Ohio. It occupies a room in the State House.

The State Law Library, also in the State House, is the largest and most complete law library in the State. It contains complete sets of the English, Scotch, Irish, Canadian, United States and State reports, statutes and digests. The important legal periodicals are on file.

CITY LIBRARIES

The students of the University, as residents of Columbus, have access to the City Library and the Public School Library, under the usual regulations. The City Library numbers 28,000 volumes. It has specially pleasant reading and reference rooms. The Public School Library numbers 35,000 volumes, and is a well selected collection of books. Students will find both libraries valuable in supplementing the University Library.

SPECIAL LIBRARY IN ECONOMICS

The University possesses a special library in Economics consisting of several hundred volumes and pamphlets. Over thirty financial, commercial and trade

journals are received and filed regularly. The business men of Columbus have contributed over $1,200 for the equipment of this commercial library.

SPECIAL LIBRARY IN ZOOLOGY AND ENTOMOLOGY

The Department of Zoology and Entomology possesses a special library the nucleus of which was the scientific library of the late Prof. Kellicott which was generously donated to the Department. This has been increased by gifts of special papers by a number of the leading investigators of the country and will be enlarged as rapidly as possible. The private library of the professor is also accessible for reference.

AIDS TO MORAL AND RELIGIOUS CULTURE

Chapel services are held daily (except Saturday and Sunday) at the University, at which the attendance of all instructors and students is expected. The services consist of singing, reading the Scriptures, and prayer.

One of the most commendable organizations in the University is a branch of the International Young Men's Christian Association, organized in 1883. It has a large membership and steadily grows in influence. Services are held weekly. New students are made cordially welcome, and young church members will here enjoy Christian influences and fellowship in college life. A University Circle of the International Order of the King's Daughters and Sons holds its meeting once a week, and includes in its membership a majority of the women attending the University. A club for the study and practice of philanthropy has recently been organized by the King's Daughters.

An effort is being made, to complete, by subscription, the fund which was begun two years ago by students, alumni and professors, for the erection of a building to accommodate the student organizations of the University.

LITERARY AND OTHER SOCIETIES

The Alcyone Literary Society, open to young men, was founded in 1874; the Horton Literary Society, open to young men, was founded in 1875; the Athenæan Literary Society, open to young men, was founded in the winter of 1896–'97. The Browning Literary Society, founded in 1883, and the Philomathean Literary Society, founded in 1894, are open to young women. These societies have commodious and well furnished apartments in University Hall. They meet weekly, and their work, offering to the student a very desirable training in composition, public speaking, and parliamentary order, is a valuable adjunct to collegiate education.

The Townshend Literary Society was established in 1883 as a technical society under the name of the Kirtland Agricultural Society. In 1894, the name Townshend was substituted. In 1898, the Society changed its constitution so as to admit any student of the University and thus became a literary rather than a technical society. It meets weekly in its commodious and well arranged society room in Townshend Hall.

The Biological Club is an organization of professors and students for mutual assistance and improvement in the line of natural science. Its meetings are regularly held every two weeks, at which papers are read, notes of observation and research presented, and current biological literature discussed.

The Chemical Association, composed of the more advanced students and instructors in the Department of Chemistry and Pharmacy, has for its object the discussion of such subjects as are of importance to students of chemistry, special

stress being placed on recent discoveries. The meetings are held semi-monthly and are of great interest. Both professors and students contribute to each program.

The Political Science Club is an organization of instructors and students in political science and history for the consideration of questions in those fields. At the regular bi-weekly meetings papers are read, researches reported, and current questions and publications in political science, considered and discussed.

The Engineering Society is a similar organization of students and instructors, holding meetings bi-weekly, for the consideration of questions in the various branches of engineering.

The Organic Evolution Club was organized in the winter of 1896-'97 by those students and members of the Faculty especially interested in the study of Evolution. The Zoological Department has a similar club known as the Journal Club.

The O. S. U. Dramatic Club was organized in 1893. Its object is to present each year to the University world one of the standard legitimate dramas. Its membership is confined to University circles.

The musical organizations of the University are: The O. S. U. Glee Club, composed of sixteen members; the O. S. U. Mandoline and Guitar Club of twenty members; the O. S. U. Banjo Club of five members; the O. S. U. Orchestra of fifteen members; the O. S. U. Male Quartet and the University Cadet Band.

The Ornithological Club encourages observation and research in the study of birds and their habits, especially of our native species. The Wheaton collections in the possession of the University forms a basis of study. The programs consist of papers and discussions and reports of observation and personal work. Anyone interested in birds is eligible to membership and visitors are always welcome. The Club meets on the second and fourth Monday evenings of each month.

The O. S. U. Sketch Club has for its purpose the promotion of art interests among the students and ex-students. Any one who is or has been connected with the University in any capacity is eligible to membership. The members meet once a week and sketch from the draped human figure. Twice a month the members present sketches illustrating some word, etc., previously selected. All work is criticised by members of the club for mutual benefit.

The English Club, composed of the instructors and advanced students of the English departments, holds bi-weekly meetings at which new books in current literature are discussed and papers on literary topics are presented.

The William F. Hunter Society, in the College of Law, meets for moot-court practice and quiz-work every two weeks.

MILITARY SCIENCE AND TACTICS

Under the law of Congress establishing the University, it is required that instruction shall be given in military science and tactics. In accordance with this provision an officer of the regular army has been detailed to take charge of the Department of Military Science and Tactics; and the Trustees have directed that all male students, except those in the Law College, and such others as may be specially excused for physical disability or for having reached the age limit of twenty-five years, shall render two years of cadet service as a condition of graduation. A uniform has been prescribed with which each member is required to provide himself; and fifty minutes a day are devoted to drill, except on those days when instruction in tactics and art of war is given.

The course of instruction is both practical and theoretical. It is given by means of a systematic drill, supplemented by lectures and recitations, and is so

arranged as to occupy five hours per week throughout the year. For purposes of drill, all students enrolled in the Department are organized in a battalion, the officers of which are selected from those students who have shown special proficiency in their University work and the work of the Department. Commissioned officers and non-commissioned officers receive certificates of satisfactory service, issued by the University. A cadet band has been organized in connection with this Department, and is supplied with instruments belonging to the University and to the cadets.

The practical course in infantry embraces all the movements prescribed by the drill regulations of the U. S. Army applicable to a battalion. Instruction in artillery embraces such portions of the United States drill regulations as pertain to the formation of detachments, manual of the piece, mechanical maneuvers and aiming drill. Instruction also includes duties of sentinels, the various ceremonies performed by troops, and military signaling. The theoretical instruction includes a systematic and progressive course in drill regulations of the U. S. Army, the organization and administration of the U. S. Army and the elementary principles governing in the art of war.

Competitive drills are held yearly for two medals; one, the first prize, of gold, presented to the University by the M. C. Lilley Co., of Columbus, Ohio; the other, the second prize, of silver, presented by Lieut. Wilson, when commandant. These medals remain the property of the University, the winner wearing them until the next competition. The "President's Prize" consists of an officers' sword, given to the captain of the company having the best record for attendance for the year.

The equipments of the Department consist of three hundred Springfield cadet rifles and sets of infantry equipment, twenty officers 'swords and belts, the necessary equipment for instruction in signaling, and a few instruments for the band.

The U. S. Ordnance Department furnishes an annual allowance of one thousand rounds of ball and one thousand rounds of blank cartridges for cadet rifles.

PHYSICAL TRAINING

Competent instruction in hygiene and general sanitation is given by the director of the Gymnasium, who has entire charge of the physical training and well-being of all students. Supplementing this work, the practical instruction in military tactics is found to be a most valuable aid. In addition to this, the University grounds afford excellent opportunities for general athletics, and the students support well organized clubs in base ball, foot ball and lawn tennis. These and other sports are participated in by large numbers, and friendly contests are occasionally held with other colleges. Besides the special clubs named above, the students have an athletic association which holds an annual "Field Day," in which prizes are given to the victors in the various contests usual on such occasions.

OHIO FORESTRY BUREAU

This Bureau has been established and located at the University by the Legislature for the purpose of inquiring into the best means of preserving and utilizing the forests of the State.

TERMS AND VACATIONS

The first term of the University year 1900-1901 and thereafter will begin on the Tuesday following the sixteenth day of September and will close on the

Wednesday following the 17th day of June. The first term will close on the Wednesday preceding Christmas; the second term will begin on the Tuesday following the first day of January and will close on the Friday preceding the first Monday in April; the third term will begin on the Wednesday following the close of the second term. The second semester will begin on Monday of the eighteenth week preceding commencement week; and the first semester will close on the Friday preceding the opening of the second semester.

Regular college exercises will be suspended from 4 o'clock p. m. of the Wednesday preceding Christmas until 8 o'clock a. m. of the Tuesday following the first day of January; on Thanksgiving and the day following; on University day which is the twenty-second day of February; from 4 o'clock p. m. of the Friday preceding the first Monday in April until 8 o'clock a. m. of the Wednesday following the first Monday in April; and on Memorial Day.

FEES

THE COLLEGES

INCIDENTAL FEE.—A charge of fifteen dollars a year is made against all students, under the head of incidental expense. In the case of former students if this fee is not paid until the second day of the term one dollar will be added, and for each succeeding day of delinquency fifty cents will be added.

LABORATORY FEES.—Students in the laboratories and shops are required to pay fees to cover, in part, the cost of the material consumed, and the deterioration of the expensive instruments used by them. The fees charged per term in the laboratories mentioned below are as follows:

Agriculture, 6	$10 00
" 15	5 00
Anatomy and Physiology, 53, 54, 55, 56, 59, 60	7 50
" " (Vet. Medicine) 4	5 00
Botany, 4, 6, 7, 8, 6a	2 00
" 53, 55, 57, 58, 59, 60, 64	3 00
" 56 (half semester)	1 50
Ceramics, 1, 2, 3, 7, 8	1 50
" 9, 10, 11, 12	5 00
Chemistry, 8, 14, 16, 61b, 11, 18, per term $1 50, per semester	2 25
" 61a Lab	1 50
Domestic Science, 1, 2, 3, 4, 11, 12, 13	5 00
" " 5, 6, 7, 8, 9	1 00
Drawing, 7	2 00
Elec. Engineering, 4, 5, 4 or 5 hrs., $7.00; 3 hrs. or less	5 00
" ", 6 and 7 combination	5 00
Gymnasium; per term, $1.00; per semester	2 25
Law of Contracts (Engineering)	5 00
Law when elected 5 hours or less, per semester	7 50
Metallurgy, 3, 5, 6	1 50
Mechanical Engineering, 12, 13, 14, 15, 16, 17, 23, 24, 25	5 00
Pharmacy, 7, 8, 9, 10, 11, 15, 17, 18, 51	1 50
Pharmacy, 52	2 25
Physics, 5, 6, 7, 9, 3hrs., $5.00; over 3 hrs	7 00
Physics, 55, 56, 57, 58, 60, 3 hrs., $7.50; over 3 hrs	10 50
Shopwork, 4 hrs, or less	5 00
Shopwork, 5 hrs. or more	7 00

Zoology and Entomology, 53, 54, 55, 56, 61, 62	$7 50
Zoology and Entomology, 57, 58, 59, 60	4 50
Zoology and Entomology (Agriculture), 4, 7	1 00

The fees of the College of Law are $30 per semester, including the usual incidental fee.

In the laboratories of the Department of Chemistry and Agricultural Chemistry, each student is required at the beginning of each term to pay a fixed charge of one dollar and fifty cents for gas and water ($2.25 each semester). He is also required to buy his own supplies, as he needs them, at the general storeroom in Chemical Hall, where laboratory supplies are sold to students at first cost to the University.

All term dues must be paid at the opening of each term as a condition of admission to classes.

AUDITOR'S FEE

On presentation to the Bursar of the written consent of the head of a department, and on payment to the Bursar of an auditor's fee of one dollar, any person engaged in teaching is permitted to attend, in that department, any class or course (not to exceed three hours a week for one-half year) which is announced to be especially for teachers or those intending to teach.

GRADUATION FEE.—A fee of five dollars, to cover expense of graduation, diplomas, etc., is required of each person receiving one of the ordinary degrees from the University, and this fee must be paid before the degree is conferred. A like fee of ten dollars is charged to each person receiving one of the higher graduate degrees.

FREE SCHOLARSHIP IN AGRICULTURE AND DOMESTIC SCIENCE, AND IN VETERINARY MEDICINE.—A free scholarship, good for the two-year Courses, or for the First year of the Short Courses and the First year of the four-year Courses in the College of Agriculture and Domestic Science, is granted to one student annually from each county in Ohio. Each scholarship is valid two years from its grant, and covers the incidental fee and all laboratory fees (except gymnasium fee), but the person appointed to receive its benefits is subject to all the other conditions prescribed for admission to the Course. If in any county there is no applicant for the free scholarship in Agriculture, then a free scholarship, good for two years in the College of Veterinary Medicine, may be granted, subject to the same conditions as are prescribed for the free scholarship in Agriculture. The appointments are made by the county boards of agriculture, and are not transferable by the appointees. To learn whether the scholarship of a given county for the current year has been granted, inquiries should be addressed to the Secretary or President of the County Agricultural Society. For further information concerning these scholarships, inquiries should be addressed to the Dean of the College of Agriculture and Domestic Science.

THE COLLEGE OF LAW

INCIDENTAL FEE.—An incidental fee of fifteen dollars per year is charged to regular undergraduate students.

Upon payment of the incidental fee, law students will be admitted to all the privileges of all the other Colleges of the University, upon the same terms as to admission, discipline, character of studies selected, etc., as other students in the University.

TUITION FEE.—In addition to the incidental fee named above, a tuition fee of twenty-two dollars and fifty cents per semester is charged to regular undergraduate students.

THE COLLEGES

THE COLLEGES

ADMISSION

The University is open on equal terms to both sexes.

The entrance examinations for 1900 will be held on Monday and Tuesday, June 11 and 12, and on Monday and Tuesday, September 17 and 18. A part of the examinations may be taken in June and the remainder in September. Conditions incurred at the June examinations must be removed at the September examinations.

Applicants for admission to the Colleges of Agriculture, of Arts, Philosophy, and Science, or of Pharmacy, must be at least sixteen years of age; for admission to the College of Engineering or of Veterinary Medicine must be at least seventeen years of age; for admission to the College of Law must be at least eighteen years of age. Each must be provided with credentials of scholarship from his last instructor or from the last institution with which he has been connected, and with a certificate of good moral character.

There are three modes of admission to the University:

1. Certificates of the preparatory departments of Colleges of approved standing and of Normal schools in Ohio are accepted, if found satisfactory, in lieu of examination for preparatory studies, under the following conditions:

Each certificate must contain a detailed statement of the studies pursued, the text books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination, and the applicant's rank or standing in it. A copy of the course of study should accompany the certificate; and both should be sent to the University not later than the first of September. *The University cannot promise this recognition to those certificates presented during entrance week.*

Blank certificates will be furnished on application.

Applicants for admission who come from other Colleges or Universities are required to bring certificates of honorable dismissal.

Teachers' certificates (in force) will be accepted at their face value.

2. From time to time the University approves the courses of study in certain High Schools of the State; and the graduates of these High Schools are admitted on certificates in accordance with following rules:

Rule 17. Upon request from the Board of Education or the Superintendent of Public Schools of any town in Ohio for the inspection of the High School, the Faculty shall appoint a committee of two of its own number to visit such school. This committee shall thoroughly inspect the school to ascertain whether its graduates may be reasonably supposed to possess the necessary qualifications for admission to the University. After such inspection, the committee shall report its conclusions in writing, with the reasons therefor, to the Faculty, which shall then decide by vote whether the graduates of the school shall be admitted without examination, such privilege, if granted, not to extend beyond the period of three years without re-examination of the school.

Rule 94. Such diplomas and certificates shall be accepted in lieu of examination for preparatory studies only under the following conditions:

(a) The certificate must state in detail the studies pursued, the text-books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination in it, and the rank or standing of the candidate in it.

(b) The certificate will be accepted for such studies only, or such part of each, as it shall show to have been satisfactorily accomplished.

(c) Every such certificate must be accompanied with a diploma showing that the candidate has completed the course of study in the school from which he comes. But the General Faculty may except from this condition schools whose work is known to be exceptionally good, provided that the candidate has attended the school two full years.

(d) In case the authorities of any high school, academy or normal school in Ohio desire to have a definite standing fixed for the admission of its graduates, a committee of the General Faculty will visit the school, and on the report of this committee a standing will be fixed for the graduates of the school. Such standing shall not be good, without re-examination, after three years.

(e) Whenever, after a sufficient trial, it becomes evident that the graduates of any school are not adequately prepared, the diploma and certificate of such school will no longer be accepted.

Rule 95. No applicant for admission to the University will be accepted who is deficient or conditioned in required entrance work representing in the aggregate more than one daily recitation for a year. In the case of candidates for admission to the College of Arts, Philosophy and Science, not more than two-thirds of this deficiency may be in any one subject; and in the case of candidates for admission to the College of Engineering, not more than one-third of this deficiency may be in mathematics.

3. All other applicants are subject to examination on the groups of study mentioned below under the headings of those Colleges and Courses in the University which they desire to enter.

Full equivalents for the text-books named will be accepted.

ADMISSION TO SPECIAL STUDIES

Students who desire to pursue special lines of work in any of the Colleges of the University, and do not desire to become candidates for degrees, will be admitted on the following conditions.

Rule 96. Students who desire to pursue special lines of work in the University, and do not desire to become candidates for degrees, will be admitted on the following conditions:

(a) The regular entrance examinations must be satisfied.

(b) But applicants who are not less than twenty-one years of age (eighteen years in the College of Engineering and of Pharmacy), after obtaining credit for the common English branches, may be excused from examination in such studies as may be deemed best by the Executive Committee of the appropriate college; provided, that if any such student afterwards becomes a candidate for a degree he shall pass the omitted examinations at least one year before the degree is conferred.

Rule 97. Students desiring to pursue special lines of work in the University shall, upon admission, lay before the Executive Committee of the appropriate college for approval or modification, a written statement of the end they have in view, the studies proposed for the attainment of that end, and the probable period of residence at the University. Such students shall be held as regularly to their

accepted schemes of work as are regular undergraduates to their prescribed courses of study. Admission will be refused to, or withdrawn from, all of whose definiteness of purpose the Executive Committee fail to receive satisfactory evidence.

ADMISSION TO ADVANCED STANDING

Rule 98. Applicants for advanced standing who do not come from some other university or college will be examined in the studies preparatory to admission to the appropriate college, and also in such undergraduate studies as they may wish to be credited with in advance. Applicants who have completed at least one years' work in an approved college, and who bring explicit and official certificates describing their courses of study and scholarship, and letters of honorable dismissal, will be admitted without examination, except such as may be necessary in order to determine what credit they are to receive for work done in the college from which they have come, and what courses of study they may with profit pursue in the University.

GRADUATION

Rule 99. No one will be admitted to candidacy for a degree at any Commencement who has not done the last year of work required for the degree, in residence at this University, and no student will be registered in such candidacy later than the first day of October.

Rule 128. Except by unanimous consent of the Faculty, no candidate for graduation will be recommended for a degree whose record is not in all respects complete by the Friday evening previous to the Commencement Day at which he seeks the degree; and all students shall be notified of this rule at the beginnig of their graduation year, and the rule (except the last clause) shall be printed in the annual catalogue.

Rule 137. No candidate for graduation will be permitted to register for the second term or semester of his graduating year except upon presentation to the Bursar, of the President's certificate that his thesis subject has been announced and approved.

XI. EXAMINATIONS AND STANDING

Rule 111. Students shall be regarded as strictly on probation until they have removed all deficiencies and conditions in entrance requirements.

Rule 112. Students who have any entrance conditions outstanding at the beginning of the third year of residence at the University will not be allowed to join their classes until such conditions have been removed.

Rule 116. The standing of students in each study shall be reported at the end of each term or semester, as "merit," "passed," "conditioned," or "failed." This standing shall be determined by the head of each department by such means and methods as he may choose, but no student shall be reported "failed" without having had the opportunity of a written examination.

Rule 117. The standings "merit" and "passed" indicate that the student has full credit for the term's or semester's work in the study in which this standing is obtained.

Rule 118. The report "credit" (K) shall be used only for work done in regular class at the University.

Rule 119. The standing "conditioned" indicates that credit for the term's or semester's work in the study in which the condition was incurred is withheld. In the following term the student shall be given an opportunity to obtain credit

by a special re-examination; or, if the study be a continuous one, the instructor in charge may, at his discretion, excuse the student from re-examination, and may allow him to obtain credit by pursuing the study successfully during the following term or semester. If the student thus excused from re-examination does not pass upon the work of the second term or semester, he shall be reported as "failed" in the work of both terms or semesters. Any condition that is not removed within one year from the beginning of the term or semester in which it was incurred shall lapse into a "failure."

Rule 120. The standing "failed" indicates that the student has obtained no credit whatever for the term's or semester's work in which the mark is given. The student must, at the first opportunity, repeat in class the study in which he has failed. But a student who has failed in an elective study may be excused from repeating such study by the Executive Committee of his college. In case of failure in any continuous study, the work of the term or semester in which the failure is incurred must be repeated in class before any subsequent term's or semester's work in that study can be commenced. Unexcused absence from any regular examination is construed as a failure therein.

Rule 121. Any student who fails at the end of any term or semester to secure full credit for two-thirds of his work shall be put on probation for the following term or semester with restricted work, and, if similarly delinquent in his studies at any time within the next ten academic months, shall thereby cease to be a member of the University.

Rule 122. If, for any cause, the preparation, progress or success of any student in the work assigned him be found unsatisfactory, the President may remove him from a class or dismiss him from the University.

ADMISSION TO GRADUATE WORK

Graduates of this or other institutions may, on application to the Faculty, enter the University and pursue such lines of work as may be arranged or approved by the appropriate collegiate committee. Such graduate students are subject to all the ordinary regulations (as to fees, attendance, etc.), prescribed for undergraduates.

IN THE COLLEGES OF AGRICULTURE AND DOMESTIC SCIENCE, ENGINEERING, LAW AND PHARMACY

Masters degrees are conferred upon graduates in Agriculture, Horticulture and Forestry, Engineering, Law and Pharmacy at the end of not less than one year's residence, which shall be wholly devoted to the completion of an approved course of study in the University. Each is required in addition to present an acceptable thesis upon some subject connected with his course of study.

IN THE COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

1. The degree of Master of Arts will be conferred upon candidates holding the degree of B. A. or B. Ph. from this University or from other institutions making equivalent requirements for those degrees, upon the satisfactory completion, during not less than one year of residence (devoted exclusively to such work), of an approved course of study, covering a major subject and an allied minor subject. The major subject (two-thirds) shall be graduate work, taken in one of the departments of the Arts, Philosophy and Science College. The minor subject (one-third) may be in graduate work.

2. The degree of Master of Science will be conferred upon candidates holding the degree of B. Sc. from the General Science Course of this University or from institutions making equivalent requirements for this degree, and also upon graduates from the College of Engineering of this University, upon the terms specified for the degree of Master of Arts; except that the major subject must be taken in one of the Departments of Science in the Arts, Philosophy and Science College. The minor subject must be in an allied Science.

3. The degree of Master of Arts will be conferred upon candidates holding the degree of B. A. or B. Ph. and the degree of Master of Science upon candidates holding the degree of B. Sc. from this University or from other institutions making equivalent requirements for these degrees, and the degree of Master of Science will be conferred on graduates from the College of Engineering of this University, on the completion, during not less than one year of residence of a course of study in one or more of the departments of the College of Arts, Philosophy and Science, not less than one-third of which course must be graduate work and not more than two-thirds may be such undergraduate work as is announced to be elective, such course to be subject to the approval of the Executive Committee of the Faculty of the College of Arts, Philosophy and Science. But a degree conferred under the provisions of this paragraph shall in no case be counted towards the degree of Doctor of Philosophy, or Doctor of Science.

4. With the consent of the Faculty the work of candidates for the Master's degree may be distributed over more than one year.

5. Each candidate for a Master's degree must also prepare and submit a thesis, and after its acceptance, be examined upon the work assigned him.

6. The degree of Ph. D. or of D. Sc. will be conferred upon holders of the appropriate baccalaureate degree from this University, or from other institutions making equivalent requirements for the first degree, upon the satisfactory completion of three years of resident graduate work in the Arts, Philosophy and Science College, including thesis and examinations. Holders of the degree of Master of Arts or Master of Science from this University, under the conditions prescribed in paragraph one or two, or from other institutions making equivalent requirements for these degrees, may receive the Doctor's degree on the satisfactory completion of two years of resident graduate work after obtaining the Master's degree. On approval of the Faculty, the work of the first year or of the first two years, of the three, may be done at another University which offers equivalent graduate work.

7. Candidates for the degree of Doctor of Science must take their work wholly in Science.

8. With the consent of the Faculty the work required of candidates for Doctor's degrees may be distributed over more than three years.

FELLOWSHIPS

To encourage graduates of this University, and of other similar and approved institutions in this state, to continue their work and to complete the courses necessary to second (and other) degrees, the University authorities have established fellowships in several departments. These demand about one-half of the time of the fellow for laboratory instruction or other similar assistance—as far as possible, along the line of his graduate study. The remainder of his time is given to graduate work. The fellowships pay from $250 to $300 for the University year.

Rule 151. So far as student work is concerned, Fellows shall be subject to the regulations of the various colleges in regard to graduate students.

Following are the fellowships for the academic year 1899–1900 as far as at present determined:

Anatomy and Physiology, Botany, Chemistry (two), American History and Political Science, Industrial Arts, Mathematics (two), Mechanical Engineering, Philosophy, Rhetoric and English Language, Veterinary Medicine.

In addition to these, Mr. Emerson McMillin has established two fellowships: one in Astronomy, $300 for the academic year; and one in Economics, $250 for the academic year. No service is required in these fellowships, and fellows are expected to give their entire time to their graduate work.

Correspondence should be directed to the Executive Office of the University.

PRIZES

Through the generosity of Hon. William J. Bryan an annual prize of fifteen dollars is offered for the best essay on the principles underlying the form of government of the United States. Competition for this prize is open to all students of the University.

The Edward Thompson Company offer annually to the student writing the best essay on a legal theme selected by the Faculty of the College of Law, the second edition of the English and American Encyclopedia of Law, which includes about thirty volumes.

Other prizes are offered in special departments, for which see department circulars or the heads of the departments

GENERAL RULES FOR STUDENTS

Rule 51. Each student shall at the beginning of the year give, in writing, his or her local address to the President, and shall promptly report all subsequent changes of address.

Rule 53. Smoking is prohibited in the halls, basements, and lecture rooms of the University buildings.

Rule 56. The rooms of University student organizations which are located in the University buildings shall not be used for purposes other than the usual exercises of such organization without the previously obtained consent of the General Faculty.

Rule 57. No arrangements or announcements shall be made by students for any public gathering or exercises in the University buildings without the previously obtained consent of the President.

Rule 66. All absences of individual students from the city, for any purpose, involving absence from college exercises, must be accounted for to the President; and in all possible cases permission must be previously obtained.

Rule 86. All students are required to register on the first day of each term or semester.

Rule 88. In the case of former students, if the incidental fee is not paid until the second day of the term or semester, one dollar will be added, and for each succeeding day of delinquency fifty cents will be added.

Rule 89. The assignment of work shall be made and recorded for each student, as shall be determined by the several faculties; but at the beginning of each term or semester, each student's card shall be signed by the Secretary of his College before presentation to the Bursar.

COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE

FOR ADMISSION[1]

The following are the requirements:

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following Books, or equivalents: Shakespeare's *Merchant of Venice, Julius Caesar and Macbeth*; Milton's *Lycidas, Comus, L'Allegro*, and *Il Penseroso*; Burke's *Conciliation with the Colonies*; Macaulay's *Essays on Milton and Addison*; The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of all of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Venable's Easy Algebra, complete.

4. *Botany*—Gray or Kellerman's Elementary Botany and Spring Flora, or equivalent.

7. *Latin*—Pronunciation (the Roman method): Grammar (an exact knowledge of the inflections is essential); Cæsar, the first four books of the *De Bello Gallico.*

Or *French*—The whole subject of French Grammar. Applicants will be expected to read at sight easy French and to translate correctly into French simple English sentences. Two years ought to be given to this study, the first year being spent mainly on the Grammar with easy reading; the second devoted to reading good Modern French, with grammatical analysis and exercises in writing. The texts read should be chiefly narrative and conversational prose; one or more prose comedies of the nineteenth (*not* the seventeenth) century should be included.

Or *German*—Joynes-Meissner's or Thomas's Grammar is recommended. The essentials in these grammars should have been mastered thoroughly, i. e., declensions of nouns and adjectives, pronouns, comparison of adjectives, prepositions, regular and irregular verbs and essentials of syntax.

The following books or their equivalents must have been read (not less than 600 pages.)

Joynes's or Whitney's Reader, Hillern, Höher als die Kirche, Riehl, Der Fluch der Schönheit, Freytag, Die Verlorne Handschrift, Gerstäcker Irrfahrten.

Until the year 1902, the *German* or *French* required for admission may be begun at the University, but without University credits. For the year 1902 and thereafter, the full requirements as above stated will be held to.

5. *Plane Geometry*—White, Venable, Wentworth, or Wells.
6. *Physics*—Gage, Carhart and Chute, Avery, or Appleton.
7. Either of the following:
   Civil Government—Fisk or Thorpe preferred.
   History—Myers's *General History.*

OUTLINE OF THE COURSE IN AGRICULTURE

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Agr'l Chemistry (1) Principles.	5.	Agr'l Chemistry (8) Organic.	5.	Agr'l Chemistry (9) Applications.	5.
Botany (6) Physiological.	5.	Botany (7) Physiological and Economic.	5.	Botany (8) Economic Botany and Vegetable Pathology.	5.
Drawing (10)	2.				
Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.
		Shopwork (1)	3.		
Zoology (1) Invertebrate.	3.	Zoology (1) Invertebrate.	3.	Zoology (1) Vertebrate.	3.
Cadet Service (men).*		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

SECOND YEAR

REQUIRED

Agriculture (8) Breeds of Live Stock.	4.	Agriculture (9) Principles of Breeding.	4.	Agriculture (10) Stock Feeding.	4.
Agr'l Chemistry (4) Laboratory.	5.	Agr'l Chemistry (4) Laboratory.	5.	Agr'l Chemistry (4) Laboratory.	5.
Horticulture (1) Elements.	4.	Shopwork (2)	3.	Horticulture (1) Plant Propagation.	4.
Physiology (1) Anatomy.	3.	Physiology (1) Physiology.	3.	Physiology (1) Physiology.	3.
Zoology (2) Economic Entomology.	4.	Zoology (4) Economic Entomology.	2.	Zoology (4) Economic Entomology.	2.
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

* A rule of the Board of Trustees requires each male student (except students in the College of Law) to render two years' cadet service as a condition of graduation. Students physically incapacitated for cadet service will be assigned an equivalent in special gymnasium work. The President has authority to excuse from cadet service under certain conditions.

Young women are required to carry Hygiene and Physical Training in place of cadet service.

THIRD YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Agriculture (11) Farm Equipment.	4.	Agriculture (12) Soils.	4.	Agriculture (13) Crops.	4.
				Drawing (16)	3.
†French (1) Elementary, or †German (1) Elementary.	4.	†French (1) Elementary, or †German (1) Elementary.	4.	†French (1) Elementary, or †German (1) Elementary.	4.
Geology (2) General.	5.	Geology (5) General.	3.	Astronomy (3) Meteorology.	2.
Veterin'y Medicine (28)	5.	Veterin'y Medicine (29) General Pathology.	5.	Veterin'y Medicine (30) Special Pathology.	5.

FOURTH YEAR

REQUIRED

Agriculture (14) Animal Mechanics.	4.	Agriculture (15) Dairy.	4.	Agriculture (16) Rural Economics.	4.
History (5) U. S. Political.	4.	History (5) U. S. Political.	4–2.	Economics (2) Political Economy.	4.
		Economics (2) Political Economy.	4–2.		

ELECTIVE

Ten hours a week through the year, including two hours for thesis, chosen from any of the courses given in any College of the University upon which the student is qualified to enter; except in the College of Law.

THESIS

As a requisite for graduation each candidate must present an acceptable thesis embodying the results of a special research. The subject must be announced to the President of the University (dependent upon the written approval of the head of the department in which it lies) not later than the beginning of the second term of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

† Where credit is received for Elementary French or German, French (2) 4 hours or German (4) 4 hours is required.

OUTLINE OF THE COURSE IN HORTICULTURE AND FORESTRY

FIRST YEAR

REQUIRED

First Term	Credit hours
Agr'l Chemistry (1) Principles.	5.
Botany (6) Physiological.	5.
Drawing (10)	2.
Rhetoric (5) English Composition.	2½.
Zoology (1) Invertebrate.	3.
Cadet Service (men).	
Hygiene and Physical Training (women).	

Second Term	Credit hours
Agr'l Chemistry (8) Organic.	5.
Botany (7) Physiological Economic.	5.
Rhetoric (5) English Composition.	2½.
Shopwork (1)	3.
Zoology (1) Invertebrate.	3.
Cadet Service (men).	
Hygiene and Physical Training (women).	

Third Term	Credit hours
Agr'l Chemistry (9) Applications.	5.
Botany (8) Economic Botany. Vegetable Pathology.	8.
Rhetoric (5) English Composition.	2½.
Zoology (1) Vertebrate.	3.
Cadet Service (men).	
Hygiene and Physical Training (women).	

SECOND YEAR

REQUIRED

Agr'l Chemistry (4) Laboratory.	5.
*French (1) Elementary, or *German (1) Elementary.	4.
Horticulture (1) Elements.	4.
Physiology (1) Anatomy.	3.
Zoology (4) Economic Entomology.	2.
Cadet Service (men).	
Hygiene and Physical Training (women).	

Agr'l Chemistry (4) Laboratory.	5.
French (1) Elementary, or German (1) Elementary.	4.
Shopwork (2)	3.
Physiology (1) Physiology.	3.
Zoology (4) Economic Entomology.	2.
Cadet Service (men).	
Hygiene and Physical Training (women).	

Agr'l Chemistry (4) Laboratory.	5.
French (1) Elementary, or German (1) Elementary.	4.
Horticulture (1) Plant Propagation.	4.
Physiology (1) Physiology.	3.
Zoology (4) Economic Entomology.	2.
Cadet Service (men).	
Hygiene and Physical Training (women).	

THIRD YEAR

REQUIRED

Agriculture (11) Farm Equipment.	4.
French (2) or German (4) General.	4.
Geology (2)	5.
Horticulture (5) Varieties of Fruit.	4.

Agriculture (12) Soils.	4.
French (2) or German (4)	4.
Geology (5) General.	3.
Horticulture (6) Principles of Fruit Culture.	4.

Agriculture (13) Crops.	4.
Astronomy (3) Meteorology.	2.
Drawing (16)	3.
French (2) or German (4)	4.
Zoology (4) Economic Entomology.	3.
Horticulture (7) Small Fruits and Spraying.	4.

† Where credit is received for Elementary French or German, French (2) 4 hours or German (4) 4 hours is required.

FOURTH YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Horticulture (8) Elementary Floriculture	2.	Horticulture (9) Commercial Floriculture	2.	Horticulture (10) Home Floriculture.	2.
Horticulture (11) Arboriculture.	2.	Horticulture (12) Forestry and Sylviculture.	2.	Horticulture (13) Landscape Gardening.	2.
History (5) U. S. Political.	4.	History (5) U. S. Political.	4–2.	Economics (2) Political Economy.	4.
		Economics (2) Political Economy.	4–2.		

ELECTIVE

Ten hours a week through the year, including two hours for thesis, chosen from any of the courses given in any College of the University upon which the student is qualified to enter; except in the College of Law.

THESIS

As a requisite for graduation each candidate must present an acceptable thesis embodying the results of a special research. The subject must be announced to the President of the University (dependent upon the written approval of the head of the department in which it lies) not later than the beginning of the second term of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

OUTLINE OF THE COURSE IN DOMESTIC SCIENCE

FIRST YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Agr'l Chemistry (1) Principles.	5.	Agr'l Chemistry (8) Organic.	5.	Agr'l Chemistry (9) Applications.	5.
Botany (6) Physiological.	5.	Botany (7) Physiological and Economic.	5.	Botany (8) Economic Botany. Vegetable Pathology.	5.
Drawing (1)	2.	Drawing (1)	2.	Drawing (1)	2.
Rhetoric (5) English Composition.	2½	Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.
Zoology (1) Invertebrate.	3.	Zoology (1) Invertebrate.	3.	Zoology (1) Invertebrate.	3.
Hygiene and Physical Training.		Hygiene and Physical Training.		Hygiene and Physical Training.	

SECOND YEAR

REQUIRED

Agr'l Chemistry (4) Laboratory.*	5.	Agr'l Chemistry (4) Laboratory.*	5.	Physiology (3) Chemical Physiology.	3.
				Physiology (10)	2.
Domestic Economy (1)	4.	Domestic Economy (2)	4.	Domestic Economy (3)	4.
Drawing (10) Mechanical.	2.	Drawing (15) Architectural.	2.	Drawing (15) House Designing.	2.
†French (1) Elementary, or †German (1) Elementary.	4.	French (1) Elementary, or German (1) Elementary.	4.	French (1) Elementary, or German (1) Elementary.	4.
Physiology (1)	3.	Physiology (1)	3.	Physiology (1)	3.
Hygiene and Physical Training.		Hygiene and Physical Training.		Hygiene and Physical Training.	

THIRD YEAR

REQUIRED

Domestic Economy (4)	4.	Domestic Economy (5)	4.	Domestic Economy (6)	4.
French (2) or German (4)	4.	French (2) or German (4)	4.	French (2) or German (4)	4.
History (5) U. S. Political.	4.	History (5) U. S. Political.	4–2.	Economics (2) Political Economy.	4.
Education (1)	4.	Economics (2) Political Economy.	4–2.	English Literature (3)	4.
		Education (1)	4–2.		
		English Literature (2)	4–2.		

Elective: Two hours a week, through the year.

FOURTH YEAR

REQUIRED

Domestic Economy (7)	4.	Domestic Economy (8)	4.	Domestic Economy (9)	4.
Horticulture (3) Elements of Floriculture.	2.	Horticulture (9) Commercial Floriculture.	2.	Horticulture (10) Home Floriculture.	2.

* Specific laboratory work will be provided for students in this course, where necessary.

† Where credit is received for Elementary French or German, French (2) 4 hours or German (4) 4 hours is required.

ELECTIVE

Ten hours a week through the year chosen from any of the courses given in any college of the University upon which the student is qualified to enter; except in the College of Law.

THESIS

As a requisite for graduation each candidate must present an acceptable thesis embodying the results of a special research. The subject must be announced to the President of the University (dependent upon the written approval of the head of the department in which it lies) not later than the beginning of the second term of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

THE SHORT COURSES

A two–year course in Agriculture and a two–year course in Domestic Economy have been provided for those who have neither the time nor the means to pursue four–year courses. These short courses also enable those who lack the preparation for entering the four–year courses to obtain such preparation. The studies of the first year of the short courses, it will be noticed, nearly prepare the student to enter the first year of the four–year courses. The student having had chemistry in the first year of a short course can finish his preparation for either of the four–year courses during the first year of the latter course, in place of the chemistry required.

At the end of the first year of the Short Course in Agriculture, for example, the student has three strings to his bow. He may finish the second year of the short course by taking the more technical studies from the four–year courses, if lack of time or means demand it; or he may enter either the four–year course in Agriculture or the four–year course in Horticulture and Forestry. The same is practically true of the Short Course in Domestic Economy.

These short courses are not, of course, to be compared in breadth, strength, or thoroughness with the full courses of the University. They are far better preparation for the work to which they lead than no preparation; but all students are urged to take or to continue into the full four–year courses wherever possible.

ADMISSION TO THE SHORT COURSES IN AGRICULTURE AND DOMESTIC ECONOMY AND THE COURSE IN DAIRYING

Applicants must be at least fifteen years of age, and unless over twenty–one years of age must pass an examination in *Arithmetic*, *Geography*, *Grammar* and *United States History*, or bring High School or other certificates for those branches. Applicants who are over twenty–one are admitted without examination.

REQUIREMENTS FOR THE SHORT COURSE IN DOMESTIC SCIENCE.

The following are the requirements:

1. *Arithmetic, Descriptive and Physical Geography, English Grammar and United States History.*
2. *English*—(*a*) Composition and Rhetoric; (*b*) English Classics.
3. *Algebra.*
4. *Plane Geometry.*
7. Either of the following:
   Civil Government.
   General History.

OUTLINE OF THE SHORT COURSE IN AGRICULTURE

FIRST YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Agr'l Chemistry (1) Principles.	5.	Agr'l Chemistry (8) Organic.	5.	Agr'l Chemistry (9) Applications.	5.
Mathematics (1) Algebra.	5.	Mathematics (3) Geometry.	5.	Botany (1) Elementary.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Geology (1) Physiography.	5.
Drawing (10) Mechanical.	2.	Shopwork (1)	3.	Physiology (2) General.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Not less than fifteen hours per week through the year; chosen from any of the following courses subject to conditions named under "Departments of Instruction."

Agriculture (8) Breeds of Live Stock.	4.	Agriculture (9) Principles of Breeding.	4.	Agriculture (10) Stock Feeding.	4.
Agriculture (11) Farm Equipment.	4.	Agriculture (12) Soils.	4.	Agriculture (13) Crops.	4.
Agriculture (17) Milk Sanitation.	3.				
Botany (6) Physiological.	5.	Agriculture (15) Dairy.	4.	Zoology (7) Entomology.	3.
Horticulture (1) Elements.	4.	Horticulture (1) Greenhouse Construction.	4.	Horticulture (1) Plant Propagation.	4.
		Shopwork (2)	3.		
Veterinary Medicine (28) Anatomy.	5.	Veterinary Medicine (29) General Pathology.	5.	Veterinary Medicine (30) Special Pathology.	5.
Horticulture (5) Varieties of Fruit.	4.	Horticulture (6) Principles of Fruit Culture.	4.	Horticulture (7) Small Fruits and Spraying.	4.
		Physiology (6)	2.		
Cadet Service.		Cadet Service.		Cadet Service.	

COURSE IN DAIRYING

The course in dairying begins each year on the Wednesday following the first day of January, and continues during the entire term. Butter-making, as practiced in the farm dairy and in the creamery, is thoroughly taught. The student performs all necessary operations in the manufacture of butter by these two methods, under the guidance of the instructors. In cheese-making the principles are taught, with elementary practice.

Agriculture (5). Dairy Farming.—Three hours each week. Lectures and recitations on breeds, breeding, feeding, selection and judging of dairy stock, equipment and management of dairy farms.

Agriculture (6). Butter and Cheese-making.—Four half days each week. Laboratory practice in running separator, churning, working butter, making cheese, milk testing, etc.

Agriculture (7). Butter and Cheese-making.—Two hours each week. Lectures and recitations.

Agricultural Chemistry (7). Milk Chemistry and Milk Testing.—Two hours each week. Lectures and laboratory practice.

Physiology (6). Bacteria in their relation to Milk, Butter and Cheese.—Two hours each week. Lectures and laboratory practice.

Veterinary Medicine (17). Diseases of the Cow.—Three hours each week.

Mehanical Engineering (26). Steam Machinery.—One hour each week.

SHORT COURSE IN DOMESTIC SCIENCE

FIRST YEAR

REQUIRED

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Agr'l Chemistry (1) Principles.	5.	Agr'l Chemistry (8) Organic.	5.	Agr'l Chemistry (9) Applications.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Botany (1) Elementary.	5.
French (1) or German (1)	4.	French (1) or German (1)	4.	French (1) or German (1)	4.
Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.	Rhetoric (5) English Composition.	2½.
Hygiene and Physical Training.		Hygiene and Physical Training.		Hygiene and Physical Training.	

SECOND YEAR

REQUIRED

Domestic Economy (1)	4.	Domestic Economy (2)	4.	Domestic Economy (3)	4.
Domestic Economy (4)	4.	Domestic Economy (5)	4.	Domestic Economy (6)	4.
Hygiene and Physical Training.		Hygiene and Physical Training.		Hygiene and Physical Training.	

ELECTIVE

Not less than seven hours per week through the year; chosen from any of the following courses subject to conditions named under "Departments of Instruction."

Botany (6) Physiological.	5.	Botany (7) Physiological and Economic.	5.	Botany (8) Economic Botany. Vegetable Pathology.	5.
Drawing (1)	2.	Drawing (1)	2.	Drawing (1)	2.
Education (1)	4.	Education (1)	4–2.	English Literature (2)	4.
		English Literature (2)	4–2.		
Horticulture (8) General Floriculture.	2.	Horticulture (9) Commercial Floriculture.	2.	Horticulture (10) Home Floriculture.	2.
Zoology (1) Invertebrate.	3.	Zoology (1) Invertebrate.	3.	Zoology (1) Vertebrate.	3.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

FOR ADMISSION TO THE COURSE IN ARTS[1]

The following are the requirements:

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, or equivalents: Shakespeare's *Merchant of Venice, Julius Caesar,* and *Macbeth;* Milton's *Lycidas, Comus, L'Allegro, and Il Penseroso;* Burke's *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison;* The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of all of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Taylor's Academic or equivalent.

4. *Botany*—Kellerman's Elementary Botany and Spring Flora or equivalent.

5. *Civil Government*—Fiske or Thorpe preferred.

6. *Geometry, Plane and Solid*—Venable, White, Wentworth or Wells.

7. *Greek*—Grammar (Goodwin's preferred) and Prose Composition; or the first 100 lessons of White's Beginner's Greek Book. Reading: The first three books of Xenophon's *Anabasis.* At least two years should be devoted to this work.

8. *History*—Either Myers's General History (or equivalent); or, if the teacher's training and the school library will warrant, Greek and Roman History on the topical method. A circular concerning the topical method will be sent on application.

9. *Latin*—Pronunciation (the Roman method); Grammar (an exact knowledge of the inflections is essential); Cæsar, the first four books of the *De Bello Gallico;* Cicero, six orations, including *Pro Lege Manilia;* Vergil, the first six books of the *Aeneid,* with Prosody; Prose Composition, Daniell or Collar or Jones or Dodge and Tuttle, entire.

10. *Physics*—Carhart and Chute, Gage, Avery, or Appleton.

For the present, the *Greek* required for admission may be begun at the University, but without University credits.

TO THE LATIN COURSE IN PHILOSOPHY

The requirements are the same as for admission to the Course in Arts; except that instead of *Greek*, the applicant must offer *French* or *German*, as follows:

French.—The requirements under this head are those of the elementary course or grade of preparatory instruction, as formulated in the "Report of the Committee of Twelve of the Modern Language Association of America," and are here stated in the terms of that report.

Applicants should be able to pronounce French accurately, to read at sight easy French prose, to put into French simple English sentences taken from the language of everyday life, or based upon a portion of the French text read, and to answer questions on the rudiments of the grammar as defined below.

Two years should be given to this preparation.

During the first year the work should comprise: (1) Careful drill in pronunciation; (2) the rudiments of grammar, including the inflection of the regular and the more common irregular verbs, the plural of nouns, the inflection of adjectives, participles and pronouns; the use of personal pronouns, common adverbs, prepositions and conjunctions; the order of words in the sentence, and the elementary rules of syntax; (3) abundant easy exercises, designed not only to fix in the memory the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (4) the reading of from 100 to 175 duodecimo pages of graduated texts, with constant practice in translating into French easy variations of the sentences read (the teacher giving the English), and in reproducing from memory sentences previously read; (5) writing French from dictation.

During the second year the work should comprise: (1) The reading of from 250 to 400 pages of easy modern (nineteenth century) prose in the form of stories, plays or historical or biographical sketches; (2) constant practice, as in the previous year, in translating into French easy variations upon the texts read; (3) frequent abstracts, sometimes oral and sometimes written, of portions of the text already read: (4) writing French from dictation; (5) continued drill upon the rudiments of grammar, with constant application in the construction of sentences; (6) mastery of the forms and use of pronouns, pronominal adjectives, of all but the rare irregular verb forms, and of the simpler uses of the conditional and subjunctive.

German —

(a) The Aim of the Instruction.

At the end of the elementary course in German the pupil should be able to read at sight, and to translate, if called upon, by way of proving his ability to read, a passage of very easy dialogue or narrative prose, help being given upon unusual words and constructions; to put into German short English sentences taken from the language of every-day life or based upon the text given for translation, and to answer questions upon the rudiments of grammar as defined below.

(b) The Work to be Done.

During the first year the work should comprise: (1) Careful drill upon pronunciations; (2) the memorizing and frequent repetition of easy colloquial sentences; (3) drill upon the rudiments of grammar, that is, upon the inflection of the articles, of such nouns as belong to the language of every-day life, of adjectives, pronouns, weak verbs, and the more usual strong verbs, also upon the use of the more common prepositions, the simpler uses of the model auxiliaries, and the elementary rules of syntax and word-order; (4) abundant easy exercises

designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (5) the reading of from 75 to 100 pages of graduated texts from a reader, with constant practice in translating into German easy variations upon sentences selected from the reading lesson (the teacher giving the English), and in the reproduction from memory of sentences previously read.

During the second year the work should comprise: (1) The reading of from 150 to 200 pages of literature in the form of easy stories and plays; (2) accompanying practice, as before, in the translation into German of easy variations upon the matter read, and also in the off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; (3) continued drill upon the rudiments of the grammar, directed to the ends of enabling the pupil, first, to use his knowledge with facility in the formation of sentences, and, secondly, to state his knowledge correctly in the technical language of grammar.

Until the year 1902, the *German* or *French* required for admission may be begun at the University, but without University credits. For the year 1902 and thereafter, the full requirements as above stated will be held to.

TO THE MODERN LANGUAGE COURSE IN PHILOSOPHY

The requirements are the same as for admission to the course in Arts; except that instead of *Latin* and *Greek*, the applicant may offer *Latin* and *French*, or *Latin* and *German*, or *French* and *German*, in the amounts specified above.

Until the year 1902, either the *French* or the *German* (but not both), required for admission may be begun at the University, but without University credits. For the year 1902, and thereafter, the full requirements as above stated will be maintained.

TO THE ENGLISH COURSE IN PHILOSOPHY

The requirements are the same as for admission to the Modern Language Course in Philosophy. But in place of one of the foreign languages the applicant may offer the following group:

1. *Chemistry*—Williams or Remsen.
2. *English Literature*—Pancoast's Introduction to English Literature and an acquaintance with representative works in each period; or, *English History*— Montgomery.
3. *Physiology*—Martin (briefer course).

Until the year 1902, one modern language required for admission may be begun at the University, but without University credits. For the year 1902, and thereafter, the full requirements as stated above will be held to.

TO THE COURSE IN COMMERCE AND ADMINISTRATION

The requirements are the same as for admission to the Modern Language Course in Philosophy.

TO THE COURSE IN SCIENCE

The requirements are the same as for admission to the Modern Language Course in Philosophy.

TO GRADUATE WORK

1. The degree of Master of Arts will be conferred upon candidates holding the degree of B. A. or B. Ph. from this University or from other institutions making equivalent requirements for those degrees, upon the satisfactory completion, during not less than one year of residence (devoted exclusively to such work), of an

approved course of study, covering a major subject and an allied minor subject. The major subject (two-thirds) shall be graduate work, taken in one of the departments of this (the Arts, Philosophy and Science) College. The minor subject (one-third) may be in graduate work.

2. The degree of Master of Science will be conferred upon candidates holding the degree of B. Sc. from the General Science Course of this University, or from institutions making equivalent requirements for this degree, and also upon graduates from the College of Engineering of this University, upon the terms specified for the degree of Master of Arts; except that the major subject shall be taken in one of the Departments of Science in this (the Arts, Philosophy and Science) College. The minor subject shall be in an allied Science.

3. The degree of Master of Arts will be conferred upon candidates holding the degree of B. A. or B. Ph. and the degree of Master of Science upon candidates holding the degree of B. Sc. from this University, or from other institutions making equivalent requirements for these degrees, and the degree of Master of Science will be conferred on graduates from the College of Engineering of this University, on the completion, during not less than one year of residence, of a course of study in one or more of the departments of this College, not less than one-third of which course shall be graduate work and not more than two-thirds may be such undergraduate work as is announced to be elective, such course to be subject to the approval of the Executive Committee of the Faculty of this College. But a degree conferred under the provisions of this paragraph shall in no case be counted towards the degree of Doctor of Philosophy, or Doctor of Science.

4. With the consent of the Faculty the work of candidates for Master's degree may be distributed over more than one year.

5. Each candidate for a Master's degree must also prepare and submit a thesis, and, after its acceptance, be examined upon the work assigned him. The regulations as to undergraduate theses apply to theses for Master's degree also.

6. The degree of Ph. D., or of D. Sc., will be conferred upon holders of the appropriate baccalaureate degree from this University, or from other institutions making equivalent requirements for the first degree, upon the satisfactory completion of three years of resident graduate work in the Arts, Philosophy and Science College, including thesis and examinations. Holders of the degree of Master of Arts or Master of Science from this University, under the conditions prescribed in paragraph one or two, or from other institutions making equivalent requirements for these degrees, may receive the Doctor's degree on the satisfactory completion of two years of resident graduate work after obtaining the Master's degree. On approval of the Faculty, the work of the first year, or of the first two years, of the three, may be done at another University which offers equivalent graduate work.

7. Candidates for the degree of Doctor of Science shall take their work wholly in Science.

8. With the consent of the Faculty the work required of candidates for Doctor's degrees may be distributed over more than three years.

COURSE IN ARTS

Degree: Bachelor of Arts

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
Greek (51) Xenophon.	4.	Greek (52) Herodotus, Homer.	4.
Latin (51) Cicero.	4.	Latin (52) Livy, Horace.	4.
Mathematics (67) Algebra, Analytics, Calculus.	3.	Mathematics (68) Trigonometry, Analytics, Calculus.	3.
Rhetoric (51) Composition.	2½	Rhetoric (52) Composition.	2½.
Cadet Service (men).*		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

One of the following (the choice being for the year):

Botany (51) or (57)	3.	Botany (52) or (58)	3.
Botany (55) Systematic and Physiological.	4.	Zoology (64) Comparative.	4.
Chemistry (51) Inorganic.	3.	Chemistry (52) Inorganic.	3.
Physics (51) or (53) Mechanics, Heat, etc.	3.	Physics (52) or (54) Electricity, Magnetism, etc.	3.
Zoology (51) Comparative Zoology.	3.	Zoology (52) Comparative Zoology.	3.

SECOND YEAR

First Semester	Credit hours	Second Semester	Credit hours
Greek (53) Lysias.	4.	Greek (54) Homer, Plato.	4.
†History (55) United States or †Economics (51) Elementary.	4.	Economics (52) Elementary or History (56) United States	4.
Latin (53) Horace, Pliny.	4.	Latin (54) Tacitus, Juvenal.	4.
English Literature (51) Introductory.	4.	Rhetoric (54) Analysis of Prose.	4.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

THIRD YEAR

Philosophy (51) Psychology.	4.	Philosophy (52) Logic and Ethics.	4.
*Major Study	4.	Major Study	4.

ELECTIVE

Eight hours a week through the year—chosen from the courses in this College (See "The Departments," page 119); *except* that, not earlier than the third

* A rule of the Board of Trustees requires each male student (except students in the College of Law) to render two years' cadet service as a condition of graduation. Students physically incapacitated for cadet service will be assigned an equivalent in special gymnasium work. The President has authority to excuse from cadet service under certain conditions.

Young women are required to carry Hygiene and Physical Training in place of cadet service.

year, studies equivalent to five hours a week for one year may be chosen from any course or courses taught in the University; provided that the studies chosen are such as the student is qualified to pursue.

FOURTH YEAR

*Major Study	5.	Major Study	5.
Electives (as in third year)	10.	Electives (as in third year)	10.

THESIS

At the beginning of the Senior year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the beginning of the second semester of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

LATIN COURSE IN PHILOSOPHY

Degree: Bachelor of Philosophy

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
French (51) Elementary, or (55) or German (51) Elementary, or (55)	4.	French (52) Prose and Plays or German (52) Elementary, or (56)	4.
Latin (51) Cato, Cicero.	4.	Latin (52) Livy, Horace.	4.
Mathematics (67) Algebra, Analytics, Calculus.	3.	Mathematics (68) Trigonometry, Analytics, Calculus.	3.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

One of the following (the choice being for the year):

Botany (51) or (57)	3.	Botany (52) or (58)	3.
Botany (55) Systematic and Physiological.	4.	Zoology (64) Comparative.	4.
Chemistry (51) Inorganic.	3.	Chemistry (52) Inorganic.	3.
Physics (51) or (53) Mechanics, Heat, etc.	3.	Physics (52) or (54) Electricity, Magnetism, etc.	3.
Zoology (51) Comparative Zoology.	3.	Zoology (52) Comparative Zoology.	3.

* Major Study. Not later than the beginning of the Third Year, each student shall elect a Major Study in one department or with the consent of the professors in charge, in two allied departments in this college. To the Major Study he shall devote not less than four nor more than ten hours a week during the third year, and not less than five nor more than ten hours the fourth year. With the approval of the proper authority, the Major Study may be entered upon in the second year; an equivalent amount of the required work of that year, not in the line of the Major Study, being postponed to the third year; but the amount so postponed shall not exceed four hours a week. In this case, the elective work of the third year will be reduced by a like amount.

SECOND YEAR.

French (55) Modern Literature or German (55) Literature.	4.	French (56) Modern Literature or German (56) Lyrics.	4.
*History (55) United States or *Economics (51) Elementary.	4.	Economics (52) Elementary or History (56) United States.	4.
Latin (53) Horace, Pliny.	4.	Latin (54) Tacitus, Juvenal.	4.
*English Literature (51) Introductory.	4.	Rhetoric (54) Analysis of Prose.	4.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

THIRD YEAR

Philosophy (51) Psychology.	4.	Philosophy (52) Logic and Ethics.	4.
†Major Study	4.	Major Study	4.

ELECTIVE

Eight hours a week through the year—chosen from the courses in this College, *except* that, not earlier than the third year, studies equivalent to five hours a week for one year may be chosen from any course or courses taught in the University; provided that the studies chosen are such as the student is qualified to pursue.

FOURTH YEAR

†Major Study	5.	†Major Study	5.
Electives (as in third years)	10.	Electives (as in third year)	10.

At the beginning of the Senior year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the fifteenth day of December of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

No one will be admitted to candidacy for a degree later than the first day of October of his last year.

* The subject not taken the first semester, to be taken the second semester.

* Major Study. Not later than the beginning of the Third Year, each student shall elect a Major Study in one department or with the consent of the professors in charge, in two allied departments in this college. To the Major Study he shall devote not less than four nor more than ten hours a week during the third year, and not less than five nor more than ten hours the fourth year. With the approval of the proper authority, the Major Study may be entered upon in the second year; an equivalent amount of the required work of that year, not in the line of the Major Study, being postponed to the third year; but the amount so postponed shall not exceed four hours a week. In this case, the elective work of the third year will be reduced by a like amount.

MODERN LANGUAGE COURSE IN PHILOSOPHY

Degree: Bachelor of Philosophy

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
French (51) or (55)	4.	French (52) or (56)	4.
German (51) or (55)	4.	German (52) or (56)	4.
Mathematics (67) Algebra, Analytics, Calculus.	3.	Mathematics (68) Trigonometry, Analytics, Calculus.	3.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

One of the following (the choice being for the year):

Botany (51) or (57)	3.	Botany (52) or (58)	3.
Botany (55) Systematic and Physiological.	4.	Zoology (64) Comparative.	4.
Chemistry (51) Inorganic.	3.	Chemistry (52) Inorganic.	3.
Physics (51) or (53) Mechanics, Heat, etc.	3.	Physics (52) or (54) Electricity, Magnetism, etc.	3.
Zoology (51) Comparative Zoology.	3.	Zoology (52). Comparative.	3.

SECOND YEAR.

French	4.	French	4.
German	4.	German	4.
*History (55) United States or *Economics (51) Elementary.	4.	Economics (52) Elementary or History (56) United States.	4.
Rhetoric (53) Analysis of Prose.	4.	English Literature (52). Introductory.	3.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

THIRD YEAR.

Philosophy (51) Psychology.	4.	Philosophy (52) Logic and Ethics.	4.
†Major Study	4.	†Major Study	4.

ELECTIVE

Eight hours a week through the year—chosen from the courses in this College, *except* that, not earlier than the third year, studies equivalent to five hours a week for one year may be chosen from any course or courses taught in the University; provided that the studies chosen are such as the student is qualified to pursue.

* The subject not taken the first semester, to be taken the second semester.

† Major Study. Not later than the beginning of the Third Year, each student shall elect a Major Study in one department or with the consent of the professors in charge, in two allied departments in this college. To the Major Study he shall devote not less than four nor more than ten hours a week during the third year, and not less than five nor more than ten hours the fourth year. With the approval of the proper authority, the Major Study may be entered upon in the second year; an equivalent amount of the required work of that year, not in the line of the Major Study, being postponed to the third year; but the amount so postponed shall not exceed four hours a week. In this case, the elective work of the third year will be reduced by a like amount.

FOURTH YEAR.

First Semester	Credit hours	Second Semester	Credit hours
†Major Study	5.	†Major Study	5.
Electives (as in third year)	10.	Electives (as in third year)	10.

THESIS

At the beginning of the Senior year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the fifteenth day of December of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

No one will be admitted to candidacy for a degree later than the first day of October of his last year.

ENGLISH COURSE IN PHILOSOPHY

Degree: Bachelor of Philosophy

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
French (51) Elementary or German (51) Elementary.	4.	French (52) Prose and Plays or German (52) Elementary.	4.
History (151) European.	3.	History (152) European.	3.
Mathematics (67) Algebra, Analytics, Calculus.	3.	Mathematics (68) Trigonometry, Analytics, Calculus.	3.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Rhetoric and English Language (69) History of English.	2.	Rhetoric and English Language (70) Development of Prose.	2.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

One of the following (the choice being for the year):

Botany (51) or (57)	3.	Botany (52) or (58)	3.
Botany (55) Systematic and Physiological.	4.	Zoology (64) Comparative.	4.
Chemistry (51) Inorganic.	3.	Chemistry (52) Inorganic.	3.
Physics (51) or (53) Mechanics, Heat, etc.	3.	Physics (52) or (54) Electricity, Magnetism, etc.	3.
Zoology (51) Comparative.	3.	Zoology (52) Comparative.	3.

* Major Study. Not later than the beginning of the Third Year, each student shall elect a Major Study in one department or with the consent of the professors in charge, in two allied departments in this college. To the Major Study he shall devote not less than four nor more than ten hours a week during the third year, and not less than five nor more than ten hours the fourth year. With the approval of the proper authority, the Major Study may be entered upon in the second year; an equivalent amount of the required work of that year, not in the line of the Major Study, being postponed to the third year; but the amount so postponed shall not exceed four hours a week. In this case, the elective work of the third year will be reduced by a like amount.

SECOND YEAR.

First Semester	Credit hours	Second Semester	Credit hours
French (55) Modern Literature or German (55) Literature.	4.	French (56) Modern Literature or German (56) Lyrics.	4.
*History (55) United States or *Economics (51) Elementary.	4.	Economics (52) Elementary or History (56) United States.	4.
Philosophy (53)	3.	Philosophy (54)	3.
Rhetoric (53) Analysis of Prose.	4.	English Literature (52) Introductory.	4.
Rhetoric and English Language (71) Old English.	2.	Rhetoric and English Language (72) Old English.	2.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

THIRD YEAR.

Philosophy (55)	3.	Philosophy (56)	3.
†Major Study	4.	Major Study	4.

ELECTIVE

Eight hours a week through the year—chosen from the courses in this College, *except* that, not earlier than the third year, studies equivalent to five hours a week for one year may be chosen from any course or courses taught in the University; provided that the studies chosen are such as the student is qualified to pursue.

FOURTH YEAR.

Major Study	5.	Major Study	5.
Electives (as in third year)	10.	Electives (as in third year)	10.

THESIS

At the beginning of the Senior year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the fifteenth day of December of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

No one will be admitted to candidacy for a degree later than the first day of October of his last year.

* The subject not taken the first semester, to be taken the second semester.

COURSE IN COMMERCE AND ADMINISTRATION

Degree: Bachelor of Philosophy

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
French (51) Elementary.	4.	French (52) Prose and plays.	4.
German (51) Elementary.	4.	German (52) Elementary.	4.
History (151) European.	3.	History (152) European.	3.
Mathematics (67) Algebra, Analytics, Calculus.	3.	Mathematics (68) Trigonometry, Analytics, Calculus.	3.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

SECOND YEAR.

French (55) Modern Literature or German (55) Literature.	4.	French (56) Modern Literature or German (56) Lyrics.	4.
*History (55) United States or *Economics (51) Elementary.	4.	Economics (52) Elementary or History (56) United States.	4.
History (153) England.	3.	History (154) England.	3.
Rhetoric (5) Analysis of Prose.	4.	English Literature (52) Introductory.	4.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

One of the following (the choice being for the year):

Botany (51) or (57)	3.	Botany (52) or (58)	3.
General Chemistry (51) Inorganic.	3.	General Chemistry (52) Inorganic.	3.
Physics (51) or (53) Mechanics, Heat, etc.	3.	Physics (52) or (54) Electricity, Magnetism, etc.	3.
Zoology (51) Comparative.		Zoology (52) Comparative.	3.

THIRD YEAR.

†Elementary Law	6.	†Contracts	4.
Philosophy (51)	4.	Philosophy (52)	4.
‡Major Study	4.	‡Major Study	4.

ELECTIVE

From the courses mentioned in the departments below, selection may be made to make up the required number of hours. Not less than sixteen nor more than

* The subject not taken the first semester, to be taken the second semester.

† In place of Elementary Law six hours; Commercial Law four hours and Corporations (Private and Municipal) two hours may be substituted. Also in place of Contracts, four hours, any two of the following may be substituted; Corporations (Private), Insurance, Agency, Sales, Mortgages.

‡ See note page 79.

eighteen hours a week are permitted and no substitutions or options further than those indicated below.

First Semester	Credit hours	Second Semester	Credit hours
Economics	2 or 3.	Economics	2 or 3.
German	2 or 3.	German	2 or 3.
History	2 or 3.	History	2 or 3.
Political Science	2 or 3.	Political Science	2 or 3.
Rhetoric (57)	3.	Rhetoric (58)	3.
Romance Language	2 or 3.	Romance Language	2 or 3.

FOURTH YEAR.

†Major Study	5.	†Major Study	5.
Electives (as in third year)	10.	Electives (as in third year)	10.

THESIS

At the beginning of the Senior year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the fifteenth day of December of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

No one will be admitted to candidacy for a degree later than the first day of October of his last year.

COURSE IN GENERAL SCIENCE

Degree: Bachelor of Science

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
Botany (51) Elementary or Zoology (51) Comparative.	3.	Botany (52) Morphology and Classification or Zoology (52) Comparative.	3.
French (51) Elementary or German (51) Elementary.	4.	French (52) Prose and Plays or German (52) Elementary.	4.
Chemistry (51) Inorganic.	3.	Chemistry (52) Inorganic.	3.
*Mathematics (67), (65) Algebra, Analytics, Calculus or Mathematics (55), (57) Trigonometry and Algebra.	4. or 5.	*Mathematics (68), (66) Trigonometry, Analytics, Calculus. or Mathematics (56), (58) Algebra and Analytics.	4. or 5.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

† Major Study. Not later than the beginning of the Third Year, each student shall elect a Major Study in one department or with the consent of the professors in charge, in two allied departments in this college. To the Major Study he shall devote not less than four nor more than ten hours a week during the third year, and not less than five nor more than ten hours the fourth year. With the approval of the proper authority, the Major Study may be entered upon in the second year; an equivalent amount of the required work of that year, not in the line of the Major Study, being postponed to the third year; but the amount so postponed shall not exceed four hours a week. In this case, the elective work of the third year will be reduced by a like amount.

* Students taking both Botany 51 and 52 and Zoology 51 and 52 will take Mathematics 67 and 68 as the required Freshman Mathematics.

SECOND YEAR

First Semester	Credit hours	Second Semester	Credit hours
Economics (51) Political Economy.	4.	Rhetoric (54) Analysis of Prose.	4.
‡French or ‡German	4.	French or German	4.
Physics (51) Mechanics, Heat, etc.	3.	Physics (52) Electricity, Magnetism, etc.	3.
Physiology (51) Human Anatomy.	3.	Physiology (52) Physiology.	3.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

Together with one of the following subjects, to be continued through the year:

(a) Botany (57), (58), each three hours credit or (59), (60), each five hours' credit for a semester. (b) General Chemistry (53), (54), each five hours' credit. (c) Mathematics (59), (61), (60), (62), each five hours' credit for a semester. (d) Zoology (53), (54), each three hours' credit, or (55), (56), each five hours' credit.

THIRD YEAR

**Geology (61) and	3.	Geology (62) and	3.
Astronomy (61) General	2.	**Astronomy (62) General	2.
or		or	
‡French or German**	4.	**Astronomy (54) Mathematical.	5.
Philosophy (53)	3.	Philosophy (54)	3.
*Major Study	4.	Major Study	4.

Elective: Four hours a week through the year—chosen from the courses in this College, *except* that not earlier than the third year:

First: Studies equivalent to five hours a week for one year may be chosen from any courses taught in the University; provided, that the studies chosen are such as the student is qualified to pursue.

Second: Additional studies equivalent to five hours a week for one year may be chosen in the College of Engineering.

FOURTH YEAR.

Major Study (as in third year)	5.	Major Study (as in third year)	5.
Electives (as in third year)	10.	Electives (as in third year)	10.

THESIS

As a requisite for graduation each student must present an acceptable thesis embodying the results of a special research. The line of research must lie within

‡ It is desired that the student on completing this course, shall possess a good reading knowledge of both French and German. Therefore, the student entering on both French and German will take both languages in the University, each for one year. He who enters on one Modern Language will continue that language one year in case he cannot read easy prose at sight and take the other language for one year. In case a reading knowledge of one Modern Language is possessed, the student will take the other language two years. The third year of Language in the case of students making the Mathematics a specialty will be that language of which the student has the less knowledge.

** Students who elect Mathematics as their Major Study shall, in the Third Year, take French or German four hours the first semester and Astronomy five hours the second semester.

* Major Study. Not later than the beginning of the Third Year each student in this course shall elect a Major Study in Mathematics or in a Science in which Laboratory instruction is given. This Major Study shall be in one department, or with the consent of the professors in charge in two allied departments in this college. To the Major Study the student shall devote not less than five not more than ten hours a week during the Fourth Year.

the field of the major study, and is subject to the approval of the professor or professors having the major study in charge; and the student shall enter on this work not later than the beginning of the Senior year, and shall devote to it not less than two hours a week, or its equivalent, for one year, independently of his other work. The subject of thesis, together with a written approval of it by the professor or professors directing the investigation, must be submitted to the President of the University, not later than the beginning of the second semester of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day. In case two or more students are pursuing the same major study, a joint research and thesis may be made.

THE SPECIAL COURSES

COURSE PREPARATORY TO LAW AND TO JOURNALISM

FOR ADMISSION

The requirements for admission to any of the four year courses in the College of Arts, Philosophy and Science; except that the applicant must not be less than eighteen years of age.

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
English Literature (51) Introductory.	4.	Economics (52) Elementary.	4.
French (51) Elementary or German (51) Elementary.	4.	French (52) Prose and Plays or German (52) Prose and Plays.	4.
History (151) European.	3.	History (152) European.	3.
Rhetoric (51) Composition.	2½.	Rhetoric (52) Composition.	2½.
Science, Elective	3.	Science, Elective	3.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

SECOND YEAR

Economics (55) Practical Problems.	2.	Economics (56) Industrial Reforms.	2.
English Literature Elective.	2 or 3.	English Literature Elective.	2 or 3.
European History (153) England.	3.	European History (154) England.	3.
American History (55) United States.	4.	Rhetoric (54) Analysis and Prose.	4.
Philosophy (53) Psychology.	3.	Philosophy (54) Logic.	3.
Rhetoric (55) Newspaper work.	1.	Rhetoric (56) Newspaper work.	1.
Rhetoric (69) History of English.	2.	Rhetoric (70) Development of Prose.	2.
Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

Note — A student desiring to continue French or German may substitute French (55 and 56), or German (55 and 56), for four hours of the studies of the second year. The studies thus deferred must be taken in the third year.

THIRD YEAR.

Not less than sixteen nor more than seventeen hours a week, including studies deferred from the second year; selections to be made from the following, subject to the conditions named in the "Departments of Instruction." In view of the fact that this is a special course for special purposes, no substitutions or options further than those indicated below, will be permitted.

First Semester	Credit hours	Second Semester	Credit hours
American History (63), (65)	2.	American History (64), (66)	3.
Economics (53), (57), (59)	2.	Economics (54), (58), (60)	2.
English Literature	2 or 3.	English Literature	2 or 3.
European History (155), (157), (161)	2.	European History (156), (158), (162)	2.
Education (57)	2.	Education (54)	2.
Philosophy (55) Ethics.	3.	Philosophy (56) Modern.	3.
Political Science (51), (55)	2.	Political Science (52), (56)	2.
Political Science (53)	3.	Political Science (54)	3.
Rhetoric (57), (69), (75)	3.	Rhetoric (58), (70), (76)	3.
Rhetoric (59)	2.	Rhetoric (60)	2.

COURSE PREPARATORY TO THE STUDY OF MEDICINE

The three-year course preparatory to the study of Medicine has been discontinued owing to the fact that the completion of this course would not, under the present requirements of the Association of Medical Colleges, enable the student to gain credit for a year's time in the medical course. While it is deemed wiser for the present not to offer a special four-year course leading to a degree, it is desired to point out that a student having a medical career in view when entering here, or determining on such a career within the first year or two of his university course, may make such elections in any of the general courses as to gain a full year's credit, both in work and time allowance in a medical college.

While studies differ in different medical curricula it may be noted that Chemistry, Zoology, Comparative Anatomy, Embryology, Histology, Physiology, Bacteriology and Materia Medica, as taught here will be accepted in the medical schools and election of these in their proper sequence will enable the student to qualify himself very thoroughly for his medical course.

Students having medicine in view will do well to consult with the professors having these studies in charge, with reference to the best sequence of election and those having a particular medical college in view can make their selections with special reference to its requirements. Students already entered in the Course Preparatory to the Study of Medicine may complete the work as arranged at the time of their entrance.

THE COLLEGE OF ENGINEERING

FOR ADMISSION TO THE FOUR-YEAR COURSES, AND TO THE COURSE IN ARCHITECTURE

The following are the requirements:

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, or equivalents: Shakespeare's *Merchant of Venice, Julius Caesar,* and *Macbeth;* Milton's *Lycidas, Comus, L'Allegro, and Il Penseroso;* Burke's *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison;* The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of all of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Taylor's Academic or equivalent.
4. *Civil Government*—Fiske or Thorpe preferred.
5. *Geometry, Plane and Solid*—Venable, Wentworth, White, or Wells.
6. *History*—Myers's General History.
7. *Latin*—Pronunciation (the Roman method); Grammar (an exact knowledge of the inflections is essential), Cæsar, the first four books of the *De Bello Gallico.*

Or *French*—The whole subject of French Grammar. Applicants will be expected to read at sight easy French and to translate correctly into French simple English sentences. Two years ought to be given to this study, the first year being spent mainly on the Grammar with easy reading; the second devoted to reading good modern French, with grammatical analysis and exercises in writing. The text read should be chiefly narrative and conversational prose; one or more prose comedies of the nineteenth (*not* the seventeenth) century should be included.

Or *German*—Joynes-Meissner's or Thomas's Grammar is recommended. The essentials in these grammars should have been mastered thoroughly, *i. e.*, declen-

sions of nouns and adjectives, pronouns, comparison of adjectives, prepositions, regular and irregular verbs and essentials of syntax.

The following books or their equivalents must have been read (not less than 600 pages): Joynes's or Whitney's Reader, Hillern's Höher als die Kirche, Riehl's Der Fluch der Schönheit, Freytag's Die Verlorne Handschrift, Gerstäcker Irrfahrten.

Until the year 1902, the *German* or *French* required for admission may be begun at the University, but without University credits. For the year 1902 and thereafter, the full requirements as above stated will be held to.

8. *Physics*—Gage, Carhart and Chute, Avery or Appleton, complete.

Note — An applicant for admission who may be somewhat in arrears in any given subject, will find opportunity to make up this work in the Columbus High Schools, which are fully accredited by the University.

No student will be admitted to the College of Engineering who is in arrears more than fifteen hours, of which not more than five hours may be in Mathematics.

COURSE IN CIVIL ENGINEERING

This course is arranged for students expecting to become surveyors or civil engineers. The plan of the course is to give (1) a thorough training in mathematics and mechanics, (2) the general principles underlying all branches of civil engineering, (3) the application of the general principles to the several branches of civil engineering. The subjects of land, railroad and topographical surveying are important features, and students can at once begin practical work. In the engineering work special attention is given to iron and steel bridge work, masonry construction and cement testing, road and railroad building and maintenance, water supply and the subject of the collection and disposal of sewage.

FIRST YEAR

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
French (1) or German (1)	4.	French (1) or German (1)	4.	French (1) or German (1)	4.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Metallurgy (2) Mineralogy.	3.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service.		Cadet Service.			

SECOND YEAR

Civil Engineering (1) Surveying.	6.	Civil Engineering (4) C. E. Drawing.	4.	Civil Engineering (2) Surveying.	6.
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geometry.	5.	Drawing (3) Shades, Shadows & Per.	3.
Mathematics (18) Space Analysis.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics and Heat.	3.	Physics (2) Electricity & Magnetism.	3.	Physics (2) Light and Sound.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

SUMMER COURSE

Civil Engineering (22). Four weeks — six days per week. Field work in land and railroad surveying.

THIRD YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Civil Engineering (3) Topog. Surveying.	4.	Civil Engineering (24) C. E. Drawing.	5.	Astronomy (6) Mathematical.	4.
Civil Engineering (16) Roads and Streets.	5.	Civil Engineering (6) Stereotomy.	4.	Civil Engineering (7) Bridge Stresses.	5.
Astronomy (4) Mathematical.	3.	Astronomy (5) Mathematical.	3.	Drawing (7) Photography.	2.
Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (7) Strength Materials.	5.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.

SUMMER COURSE

Civil Engineering (23). Four weeks — six days per week. Field work in railroad and topographical surveying.

FOURTH YEAR

Civil Engineering (8) Bridge Designing.	5.	Civil Engineering (17) Railways.	5.	Civil Engineering (18) Water Supply.	5.
Civil Engineering (15) Masonry.	5.	Civil Engineering (14) Cement Testing.	2.	Civil Engineering (10) Sanitary Engineering.	5.
Elec. Engineering. Lectures (6)	2.	Elec. Engineering. Lectures (6)	2.		
		Laboratory (7)	2.		
		Mech. Engineering (17) Laboratory.	3.	Mech. Engineering (35) Laboratory.	5.
Geology (5) General.	5.	Geology (6) Economic.	3.		

* VOLUNTARY

* French (3), two hours; or German (2), two hours; or Rhetoric (4), two hours; each for the year.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of this study must lie within the field of Civil Engineering. The subject must be announced to the President of the University (dependent upon the approval of the head of the Department) not later than the beginning of the second term of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN MINE ENGINEERING

This Course is arranged for students intending to become mining engineers and surveyors, metallurgical or technical chemists. The plan of work, therefore, while keeping mathematics, drawing and engineering prominent, also provides extended work in applied chemistry, chemical analysis, assaying, mineralogy, geology, and surveying with especial application to mines and underground work, while the treatment of ores, both mechanical in ore dressing and chemical in metallurgy, forms an important feature.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours
Drawing (1) Freehand.	2.
French (1) or German (1)	4.
Chemistry (7) Inorganic.	5.
Mathematics (14) Plane Trigonometry.	5.
Rhetoric (5) Paragraph Writing.	2½.
Cadet Service.	

Second Term	Credit hours
Drawing (1) Freehand.	2.
French (1) or German (1)	4.
Chemistry (7) Inorganic.	5.
Mathematics (15), (16) Trigonometry, Algebra.	2, 3.
Rhetoric (5) Theme Writing.	2½.
Cadet Service.	

Third Term	Credit hours
Drawing (2) Lettering.	3.
French (1) or German (1)	4.
Metallurgy (2) Mineralogy.	3.
Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Prose Analysis.	2½.
Cadet Service.	

SECOND YEAR

Drawing (3) Projections.	3.	Drawing (3) Descriptive Geometry. 3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus. 5.
Metallurgy (5) Laboratory.	5.	Metallurgy (5) Laboratory. 5.
Physics (2) Mechanics and Heat.	3.	Physics (2) Electricity & Magnetism. 3.
Shopwork (7) Woodwork.	2.	Shopwork (11) Forging. 2.
Cadet Service.		Cadet Service.

VOLUNTARY

French (3)	2.	or German (2) 2. Each for the year.

Drawing (3) Shades & Shadows.	3.
Mathematics (20) Calculus.	5.
Metallurgy (5) Laboratory.	5.
Physics (2) Light and Sound.	3.
Shopwork (4) Chipping and Filing.	2.

or Rhetoric (4) 2.

THIRD YEAR

Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (6) Mechanics. 5.
Metallurgy (4) Fuels and Iron.	5.	Metallurgy (4) Steel, Copper, Gold, etc. 5.
Mine Engineering (4) Mine Surveying.	5.	Metallurgy (6) Assaying. 5.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced. 2.

Mech. Engineering (7) Strength Materials.	5.
Civil Engineering (19) Truss Stresses.	5.
Metallurgy (3) Deter. Mineralogy.	5.
Rhetoric (3) Advanced.	2.

FOURTH YEAR

Elec. Engineering.		Elec. Engineering.
Lectures (6)	2.	Lectures (6) 2.
Laboratory (7)	2.	Laboratory (7) 2.
Geology (5) General.	5.	Geology (6) Economic. 3.
Mine Engineering (5) Mine Engineering.	5.	Metallurgy (7) Metal. Construction. 3.
Metallurgy (8) Ore Dressing.	2.	Mine Engineering (5) Mine Engineering. 5.
		Geology (7) Petrography. 2.

Mech. Engineering (3) Plans and Specifications.	5.
Mine Engineering (6) Plans and Specifications.	5.
Mine Engineering (5) Mine Engineering.	5.
Drawing (7) Photography.	2.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of such study must lie within the field of Metallurgy or of Mine Engineering. The subject must be

announced to the President of the University (dependent upon the written approval of the head of the department) not later than the beginning of the second term of the fourth year; and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN MECHANICAL ENGINEERING

This Course has for its object the qualifying of men for the mechanical engineering profession. It aims to embrace preparation for such lines of pursuit as the successful management of machinery in manufacturing establishments; the superintendence of construction; the designing and laying out of machinery plants for mills and factories; the construction of machines for particular purposes, and the designing and drawing of the same, the making of calculations respecting strength, shocks, proportion, endurance, and suitability of material for specific purposes.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
French (1) or German (1)	4.	French (1) or German (1)	4.	French (1) or German (1)	4.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Shopwork (7) Carpentry and Pattern Making.	4.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Mechanics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Drawing (3) Projections.	3.	Drawing (3) Descr. Geometry.	3.	Drawing (3) Shades & Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics and Heat.	3.	Physics (2) Electricity & Magnetism.	3.	Physics (2) Sound and Light.	3.
Shopwork (11) Forging.	3.	Physics (7) Laboratory.	2.	Physics (7) Laboratory.	3.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.
Shopwork (3) Foundry.	2.	Shopwork (4) Chipping and Filing.	3.	Shopwork (13) Machine Work.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

VOLUNTARY

French (3)	2.	or German (2) Each for the year.	2.	or Rhetoric (4)	2.

THIRD YEAR

First Term	Credit hours
Drawing (5) Technical.	3.
Mathematics (11) Differential Equations.	1.
Mech. Engineering (6) Mechanics.	5.
Metallurgy (4) Fuels and Iron.	5.
Shopwork (14) Machine Work.	3.
Mech. Engineering (12) Laboratory.	2.
Elec. Engineering.	
Lectures (6)	2.
Laboratory (7)	2.
Mech. Engineering (27) Laboratory.	5.
Mech. Engineering (33) Engines & Boilers.	5.
Mech. Engineering (18) Mach. Design.	5.

Second Term	Credit hours
Mech. Engineering (6) Mechanics.	5.
Mech. Engineering (22) Timber and Masonry.	3.
Mech. Engineering (3) Mechanism.	5.
Metallurgy (4) Steel.	2.
Shopwork (15) Advanced Machine Work.	4.
Elec. Engineering.	
Lectures (6)	2.
Laboratory (7)	2.
Mech. Engineering (34) Thermodynamics.	5.
Mech. Engineering (14) Laboratory.	4.
Mech. Engineering (18) Mach. Design.	5.

Third Term	Credit hours
Drawing (7) Photography.	2.
Civil Engineering (19) Truss Stresses.	5.
Mech. Engineering (7) Strength Materials.	5.
Mech. Engineering (3) Mechanism.	2.
Mech. Engineering (32) Power Plants.	5.
Industrial Arts (5) Shop Appliances.	3.
Mech. Engineering (19) Machine Design.	5
Mech. Engineering (15) Laboratory.	3.
Mech. Engineering (31) Hydraulic Mach.	3.
Mech. Engineering (21) Thesis Work.	5.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of such study must lie within the field of Mechanical Engineering. The subject must be announced to the President of the University (dependent upon the written approval of the head of the department) not later than the beginning of the second term of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN ELECTRICAL ENGINEERING

The object of this Course is to prepare students for the various pursuits in which the applications of electricity are prominent. Physics, especially theoretical and applied electricity, and mechanical engineering are naturally the leading subjects of the Course. General theory is treated in ample breadth, and is tested by experiments in well equipped laboratories. The laboratories are so conducted as to afford the student a degree of facility in the use of instruments and machinery only acquired by continued practice.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours
Drawing (1) Freehand.	2.
French (1) or German (1)	4.
Chemistry (7) Inorganic.	5.
Mathematics (14) Plane Trigonometry.	5.
Rhetoric (5) Paragraph Writing.	2½.
Cadet Service.	

Second Term	Credit hours
Drawing (1) Freehand.	2.
French (1) or German (1)	4.
Chemistry (7) Inorganic.	5.
Mathematics (15), (16) Trigonometry, Algebra.	2, 3.
Rhetoric (5) Theme Writing.	2½.
Cadet Service.	

Third Term	Credit hours
Drawing (2) Lettering.	3.
French (1) or German (1)	4.
Shopwork (7) Carpentry & Pattern Making.	4.
Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Prose Analysis.	2½.
Cadet Service.	

SECOND YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geometry.	3.	Drawing (3) Shade & Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics, Heat.	3.	Physics (2) Electricity, Magnetism.	3.	Physics (2) Light, Sound.	3.
Physics (3) Problems.	2.	Physics (3) Problems.	2.	Physics (3) Problems.	2.
Shopwork (11) Forging.	2.			Physics (5) Laboratory.	4.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.
Shopwork (4) Chipping and Filing.	2.	Shopwork (13) Machine Work.	3.		
Cadet Service.		Cadet Service.		Cadet Service.	
		VOLUNTARY			
French (3)	2.	or German (2) Each for the year.	2.	or Rhetoric (4)	2.

THIRD YEAR

Drawing (5) Technical.	3.	Mech. Engineering (3) Mechanism.	5.	Industrial Arts (7) Machine Design.	3.
Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (28) Laboratory.	2.
Physics (6) Laboratory.	3.	Physics (6) Laboratory.	5.	Mech. Engineering (7) Strength Materials.	5.
Physics (4) Electricity & Magnetism.	3.	Elec. Engineering (8) D. C. Machine.	4.	Mech. Engineering (32) Power Plants.	5.
Shopwork (14) Machine Work.	3.			Elec. Engineering (9) Laboratory.	4.

FOURTH YEAR

Elec. Engineering (10) Alt. Current. Mach.	3.	Elec. Engineering (10) Alt. Current Mach.	3.	Elec. Engineering (13) Applications.	5.
Elec. Engineering (11) Laboratory.	3.	Elec. Engineering (14) Designing.	4.	Elec. Engineering (14) Designing.	4.
Mech. Engineering (4) Laboratory.	5.	Elec. Engineering (11) Laboratory.	3.	Elec. Engineering (4) Laboratory and Thesis.	5.
Mech. Engineering (8) Engines & Boilers.	5.	Elec. Engineering (9) Transmission.	5.		
*Elective	3–5.	*Elective	3–5.	*Elective	3–5.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the result of a special study. The subject of such study must lie within the field of Electrical Engineering. The subject must be announced to the President of the University (dependent upon the written approval of the head of the Department) not later than the beginning of the second term of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN CERAMICS

This course is designed to create a class of engineers who shall be fitted to render to the Clay, Glass and Cement Industries the same kind of services which

* Subject to the approval of the Professor of Electrical Engineering.

have long been rendered to Mining and Metallurgical Industries by graduates of Schools of Mines.

The problems of the Ceramic Industries are not unlike those of the Mining Industries, either in kind or in adaptation to methods of technical control; but the information and scientific equipment necessary to solve these problems successfully are peculiar to those industries alone, and in the past have received little or no attention from technical schools in this country.

This course is offered with the hope of filling this long standing gap in the scheme of engineering education in this country. It is essentially an Engineering Course, following closely the lines of the other engineering courses, up to the end of the second year. In the last two years, the training specializes along the lines of Ceramic and of the application of Chemistry to this subject.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Shopwork (7) Carpentering & Pattern Making.	4.
German (1) or (4)	4.	German (1) or (4)	4.	German (1) or French (1)	4.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Ceramics (1) Laboratory.	5.	Ceramics (2) Laboratory.	5.	Ceramics (3) Laboratory.	5.
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geometry.	3.	Drawing (3) Shades, Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics and Heat.	3.	Physics (2) Electricity & Magnetism.	3.	Physics (2) Light and Sound.	3.
Physics (3) Problems.	2.	Physics (3) Problems.	2.	Physics (3) Problems.	2.
Cadet Service.		Cadet Service.		Cadet Service.	

VOLUNTARY

French (3)	2.	or German (2) Each through the year.	2.	or Rhetoric (4)	2.

THIRD YEAR

Ceramics (4) General Principles.	4.	Ceramics (5) Bricks.	5.	Ceramics (6) Pottery.	5.
Mine Engineering (4) Mine Surveying.	5.	Ceramics (7) Advanced Chemical Laboratory Work.	5.	Metallurgy (2) Minerology.	3.
Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (7) Strength Materials.	5.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.
				Shopwork (11) Forging.	3.

FOURTH YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Ceramics (9) Manufacture of Bodies.	5.	Ceramics (10) Glasses and Glazes.	5.	Ceramics (11) Enamels and Colors.	5.
Shopwork (4) Chipping and Filing.	3.	Ceramics (12) Cement.	5.	Ceramics (15) Thesis Work.	5.
Geology (5) General.	5.	Ceramics (17) Ceramic Construction.	4.	Ceramics (14) Reports.	5.
Metallurgy (4) Fuels and Iron.	5.	Geology (6) Economic.	3.	Drawing (7) Photography.	2.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of this study must lie within the field of Ceramic Engineering. The subject must be announced to the President of the University (dependent upon the approval of the head of the Department), not later than the beginning of the second term of the fourth year; and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN INDUSTRIAL ARTS

This course is designed to furnish a strong basis for those wishing to become teachers of Manual Training, and for those intending to enter the various branches of manufacture and industry, not as engineers, but as practical managers, superintendents or business men. The required part of the course combines with a general science training a large amount of drawing and shop work, in which the underlying principles and methods employed in various branches of industry are dwelt on. Large liberty of election of studies is allowed the student. His election, properly exercised, together with the required work will equip the student for a wide range of occupations along the lines stated. The aim of the course is educational as well as professional, the training of the mind and hand together.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Chemistry (2) Qualitative Analysis.	5.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
German (1) Cadet Service.	4.	German (1) Cadet Service.	4.	German (1) Cadet Service.	4.

SECOND YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	3.	Drawing (3) Shades, Shadows.	3.
Physics (2) Mechanics, Heat.	3.	Physics (2) Electricity, Magnetism.	3.	Physics (2) Light, Sound.	3.
Physics (3) Problems.	2.	Physics (3) Problems.	2.	Physics (3) Problems.	2.
Shopwork (7) Woodwork.	3.	Shopwork (9) Adv. Pattern Making.	3.	Shopwork (8) Cabinet Work.	3.
Shopwork (3) Foundry.	3.	Shopwork (11) Forging.	3.	Shopwork (12) Adv. Forging.	3.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.
Economics (51) Elementary.	4.	Economics (51 and 56).		Economics (56) Ind. and Soc. Ref.	2.
Military Drill.		Military Drill.		Military Drill.	

THIRD YEAR

Drawing (5) Technical.	3.	Industrial Arts (2) Designing.	3.	Industrial Arts (2) Designing.	3.
Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.
Shopwork (4) Chipping and Filing.	3.	Shopwork (13) Machine Work.	3.	Shopwork (14) Machine Work.	3.
Metallurgy (4) Fuels and Iron.	5.	Metallurgy (4) Steel.	2.	Civil Engineering (21) Surveying.	3.
Economics (65) Commercial Geog.	2.	Economics (65).		Economics (58 or 66)	2.
Economics (55 or 57)	2.	History (56).		History (56) U. S. Political.	4.
		Economics (55 or 57).			
		Economics (58 or 66).			
		Mech. Engineering (22) Timber and Masonry.	3.		

FOURTH YEAR

Shopwork (15) Adv. Mach. Work.	3.	Shopwork (16) Adv. Mach. Work.	3.	Shopwork (17) Adv. Mach. Work.	3.
Political Science (53) Polit. Inst. of U. S.	3.	Political Science (53). Polit Inst. of U. S.			
Elec. Engineering (6) Lectures.	2.	Elec. Engineering (6) Lectures.	2.	Mech. Engineering (32) Power Plants.	5.
Elec. Engineering (7) Laboratory.	2.	Elec. Engineering (7) Laboratory.	2.		
Industrial Arts (3) Shop Equipment.	3.	Industrial Arts (3) Shop Appliances.	3.	Industrial Arts (3) Shop Management.	3.
Industrial Arts (4) Adv. Designing.	3.	Industrial Arts (4) Adv. Designing.	3.	Industrial Arts (4) Adv. Designing.	3.
Mech. Engineering (28) Laboratory.	2.	Mech. Engineering (29) Laboratory.	2.	Mech. Engineering (30) Laboratory.	2.
		Thesis.		Thesis	3.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis embodying the results of a special study. The subject of such study must lie within the field of Industrial Arts. The subject must be announced to the President of the University (dependent upon the written approval of the head of the Department), not later than the beginning of the second term of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN CHEMISTRY

The object of this Course is to prepare students for work in Industrial Chemistry or Metallurgical Chemistry, according to electives chosen. With proper electives it will also be found a desirable course for students expecting to become general analytical chemists.

The electives are subject to the approval of the head of the department of Chemistry, or of Metallurgy and Mineralogy for students in Metallurgical Chemistry.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Chemistry (12) Qualitative Analysis.	5.
German (1) or (4)	4.	German (1) or (4)	4.	German (1) or (4)	4.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	5.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Chemistry (20) Quantitative.	4.	Chemistry (20) Quantitative.	4.	Chemistry (20) Quantitative.	4.
Chemistry (21) Physical Chemistry.	2.	Chemistry (21) Physical Chemistry.	2.	Chemistry (21) Physical Chemistry.	2.
German (5) Scientific Reading.	4.	German (5) Scientinc Reading.	4.	German (5) Scientific Reading.	4.
Physics (2) Mechanics and Heat.	3.	Physics (2) Electricity & Magnetism.	3.	Physics (2) Sound and Light.	3.
Shopwork (7) Woodwork.	3.	Shopwork (11) Forging.	3.	Metallurgy (2) Mineralogy.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

Electives three to five hours throughout the year.

The following are suggested: Mathematics (18, 19, 20), 5 hours; Drawing (3), 3 hours; Physiology (3) 3 hours; History (5), 4 hours; Economics (1), 4 hours.

THIRD YEAR

Chemistry (8) Organic.	5.	Chemistry (9) Organic.	5.	Chemistry (9) Organic.	5.
Metallurgy (5) Laboratory.	5.	Metallurgy (6) Assaying.	5.	Metallurgy (5) Laboratory.	5.
Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.	Rhetoric (3) Advanced.	2.

Electives five to eight hours throughout the year.

The following are suggested: Physical Laboratory, 3 to 5 hours; Geology, 5 hours—or Geology and Determinative Mineralogy, 5 hours; Shopwork, 3 hours.

FOURTH YEAR

Chemistry (17) Inorganic Preparations.	4.	Metallurgy (4) General.	5.	Chemistry (15) Sanitary.	4.
Metallurgy (4) Fuels and Iron.	5.	Chemistry (16) Applied.	3.	Ceramics (16) Applied.	3.
		Physiology (8) Bacteriology.	2.		

Electives to make the total work equal sixteen or eighteen hours, including Thesis work.

Students in Metallurgical Chemistry will take Ore Dressing the first term. and Metallurgy (4) 5, through the second term. For such students Chemistry (14, 15, 16) and Physiology (8) will not be compulsory.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of the study must lie within the field of Chemistry or Metallurgy. The subject must be announced to the President of the University (dependent upon the approval of the head of the department), not later than the beginning of the second term of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day.

COURSE IN ARCHITECTURE

This Course was established in 1896, to meet a growing demand for special training along this line. The extremely rapid developments, in late years, of novel methods of construction, the constantly extending list of materials used, and the creation of types of building entirely without precedent in the history of architecture, render it not only desirable, but imperative, that a large class of thoroughly trained and equipped men shall be brought forward, if this progress is to be maintained.

The employment in architecture of so many young men trained in other branches of engineering seems to prove the urgent need of those whose training is directed expressly to this end.

The Course offered gives a good training in mathematics, physics and mechanics, which are fundamental, together with a thorough drill in drawing, designing, shopwork, and the more technical branches of architecture proper.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	3.	Drawing (1) Freehand.	3.	Mathematics (17) Plane Analytics.	5.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Metallurgy (2) Mineralogy.	3.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Trigonometry, Algebra.	2, 3.	Modern Language French or German.	4.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Modern Language French or German.	4.	Modern Language French or German.	4.	Drawing (2) Lettering.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	5.	Drawing (3) Shades, Shadows.	5.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics, Heat.	3.	Physics (2) Electricity, Magnetism.	3.	Physics (2) Light, Sound.	3.
Architecture (9) History of Architecture.	3.	Architecture (10) History of Architecture.	3.	Architecture (11) History of Architecture.	3.
Architecture (12) Detail Drawing.	2	Architecture (13) Detail Drawing.	2.	Architecture (14) Detail Drawing.	2.
Drawing (14) Pen Drawing.	2.				
Cadet Service.		Cadet Service.		Cadet Service.	

THIRD YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (6) Mechanics.	5.	Mech. Engineering (7) Strength Materials.	5.
Architecture (15) Designing.	4.	Architecture (16) Designing.	2.	Architecture (17) Designing.	4.
Drawing (7) Photography.	2.	Drawing (12) Clay Modeling.	2.	Drawing (12) Clay Modeling.	2.
Elec. Engineering (6) Lectures.	2.	Elec. Engineering (6 & 7) Lectures and Lab.	4.		
Architecture (5) Decorations, etc.	3.	Civil Engineering (6) Stereotomy.	4.	Civil Engineering (19) Trusses.	5.
Rhetoric (3)	2.	Rhetoric (3)	2.	Rhetoric (3)	2.

FOURTH YEAR

Architecture (18) Designing.	4.	Architecture (4) Specifications.	2.	Architecture (6) Estimates and Supt.	4.
Civil Engineering (15) Masonry.	5.	Architecture (7) Heating, Vent., etc.	5.	Architecture (19) Designing.	4.
Mech. Engineering (23) Materials of Const.	4.	Architecture (8) Designing.	5.	Architecture (20) Thesis.	5.
Geology (5) General.	5.	Geology (6) Economic.	3.	Civil Engineering (21) Surveying.	3.
		Drawing (18) Color Work.	3.	Drawing (19) Color Work.	2.

THESIS

At the beginning of the fourth year, each student in this Course will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the beginning of the second semester of the fourth year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

REQUIREMENTS FOR ADMISSION TO THE SHORT COURSES IN MINING, IN CLAY-WORKING AND CERAMICS, AND IN INDUSTRIAL ARTS

Applicants must not be less than sixteen years of age; and unless they are over twenty-one years of age must pass an examination in Arithmetic, Geography, Grammar and Orthography, or bring High School or other certificates for these branches.

Applicants who are over twenty-one years of age are admitted without examination.

SHORT COURSE IN MINING

The Short Course in Mining is especially designed for young men who have had a practical experience in mines, and wish to study Mine Surveying, Drafting, the problems of Ventilation, Drainage, Haulage, Mine Operating, etc., and also something of the sciences bearing upon their work, but have neither the time nor the preparation for a full college course. The first year is devoted to a thorough study of the elementary mathematics and sciences necessary to prepare the student for the practical work of the second year. The experience of the past eight years

has shown beyond any doubt that any enterprising young miner can master the subject sufficiently well in the time assigned to materially increase his earning capacity and chances for promotion in his occupation.

Personal instruction is given, and it is made thoroughly practical and of such a character as to best adapt it to the needs of the individual student.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.
Mathematics (3) Plane Geometry.	5.	Mathematics (13) Geometry.	5.	Mathematics (14) Trigonometry.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Geology (1) Physical Geography.	5.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Drawing (1) Freehand.	2.	Drawing (4) Draughting.	3.	Drawing (2) Lettering.	2.
Drawing (3) Projections.	3.	Geology (4) Elementary.	5.	Metallurgy (9) Mineral Chemistry.	5.
Chemistry (7) Inorganic.	5.	Chemistry (13) Laboratory.	3.	Mine Engineering (3) Mine Operating.	5.
Mine Engineering (1) Mine Surveying.	5.	Mine Engineering (2) Ventilation and Haulage.	5.	Shopwork (11) Forging.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

SHORT COURSE IN CLAY-WORKING AND CERAMICS

The two-year or Industrial Course is designed to assist young men who have already been actively engaged in the Ceramic industries, and who, on account of mature years, or lack of means, or lack of previous educational advantages, are unable to avail themselves of the full and complete course, and yet who wish to increase their earning power or chances of promotion by fitting themselves for other than routine labor. The requirements for admission to this course are very low, and the work required throughout is much less severe than that of the four-year course; in fact, anyone who is willing to really apply himself, can retain his membership in this class, but there is no place for any but those who are thoroughly in earnest, and poor work will not be accepted from those who are able to do good work.

In short, in this Industrial Course, the department recognizes its closest medium of communication with the wants of the clay industries, and it is intended to so maintain this course as always to render the greatest good to the greatest number.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Chemistry (12) Analytical.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Geology (1) Physical Geography.	5.
Mathematics (1) Algebra.	5.	Mathematics (3a) Geometry.	5.	Shopwork (11) Forging.	3.
				Shopwork (4) Chipping and Filing.	2.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Ceramics (1) Chemical Analysis.	5.	Ceramics (2) Analysis of Clays.	5.	Ceramics (3) Analysis of Glazes.	5.
Ceramics (4) General Principles.	5.	Ceramics (5) Bricks.	5.	Ceramics (6) Pottery.	6.
Geology (2) General.	5.	Geology (6) Economic.	3.	Drawing (11) Mechanical.	5.
		Drawing (1) Freehand.	2.		
Cadet Service.		Cadet Service.		Cadet Service.	

SHORT COURSE IN INDUSTRIAL ARTS

This Course is primarily designed to extend the benefits of the same kind of training as that given in the four-year course in this subject to that class of young men who may be unable for any reason to undertake a course of four years' duration, but who aspire to become actively engaged in factory work. It has been the aim to give, in as condensed a form as possible, those studies which will most rapidly and easily be turned to practical account in manufacturing operations; such as drawing, shop work, use of machine, tools, etc., together with a grounding in the physics and mathematics which underlie these operations.

The Course will be found most valuable to young men already engaged in factory work, who find themselves limited from rising in their work on account of lack of technical education.

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Drawing (1) Freehand.	1.	Drawing (1) Freehand.	1.	Drawing (1) Freehand.	1.
Drawing (8) Geometric.	2.	Drawing (8) Projections.	2.	Drawing (2) Lettering.	2.
Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.
Mathematics (3) Plane Geometry.	5.	Mathematics (13) Space Geometry.	5.	Mathematics (14) Trigonometry.	5.
Shopwork (7) Carpentry & Pattern Making.	3.	Shopwork (9) Advanced Pattern Making.	3.	Shopwork (11) Forging.	3.
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Drawing (3) Projections.	3.	Drawing (3) Descriptive Geometry.	3.	Drawing (3) Shades, Shadows.	3.
Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Geology (1) Physical Geography.	5.
Shopwork (3), (4) Foundry and Chipping and Filing.	5.	Shopwork (13) Machine Work.	5.	Shopwork (15) Advanced Machine Work.	5.
Cadet Service.		Cadet Service.		Cadet Service.	

THE COLLEGE OF LAW

FOR ADMISSION

(Until September, 1901.)

The following are the requirements:

1. *To the First Year*—Applicants for admission to the First Year must present satisfactory evidence (by teacher's certificate—High School, Academy or College diploma—or by examination) of having a good common school education, including *United States History, Civil Government* and a thorough training in *English Composition.*

2. *The Second Year*—In addition to the requirements for admission to the First Year, applicants for admission to the Second Year must present satisfactory evidence of having completed the work of the First Year or its equivalent.

3. *To the Third Year*—In addition to the requirements for admission to the Second Year, applicants for admission to the Third Year must present satisfactory evidence of having completed the work of First and Second years, or its equivalent.

Students seeking a degree must, at the time of registration, present in addition to the requirements above mentioned satisfactory evidence of having completed a course of study, the minimum requirement of which is as follows:

Arithmetic, Civil Government, Geography, Grammar, History of the United States, Physical Geography, Physiology, Rhetoric, Physics, (Gage or an equivalent) *Geometry, Algebra,* (Wentworth's elements or an equivalent); and, in addition, the equivalent of 75 hours per week for one term of 12 weeks (a total of 900 hours) chosen from any five or more of the following subjects, one at least being a Science and two at least being in History or Political Science (unless the applicant is especially permitted to offer approved substitutes): *Botany, Chemistry, English Constitutional History, English History, English Literature, French, Geology, General History, German, Greek, Latin, Logic, Physics, Political Economy, Psychology, Surveying, Trigonometry, United States Constitutional History; provided,* that not less than 65 hours for twelve weeks (a total of 780 hours) of this work shall be of collegiate or university grade. If this last mentioned work has been done by the candidate in a College or University of good standing, certificates of such institution will be accepted. In all other cases the candidate is subject to examination on the work required from this last group. In general, in the absence of satisfactory certificates, opportunity will be given for examination in any subject required for admission as above indicated. Blanks for applications for degrees will be furfurnished on request.

FOR ADMISSION

(On and after September, 1901.)

The following are the requirements:

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, or equivalents: Shakespeare's *Merchant of Venice, Julius Caesar,* and *Macbeth;* Milton's *Lycidas, Comus, L'Allegro, and Il Penseroso;* Burke's *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison;* The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of*

Wakefield; Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of all of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Taylor's Academic or equivalent.
4. *Botany*—Kellerman's Elementary Botany and Spring Flora
5. *Civil Government*—Fiske or Thorpe preferred.
6. *Geometry, Plane and Solid*—Venable, Wentworth or Wells.
7. *History*—Either Myers's General History (or equivalent); or, if the teacher's training and the school library will warrant, Greek and Roman History on the topical method. A circular concerning the topical method will be sent on application.
8. *Physics*—Carhart and Chute, Gage, Avery, or Appleton.
9. Any two of the following languages, in the quantity indicated below. Latin, Greek, French or German, or any one of them and the group of subjects named under (*e*) below.

(*a*) *Latin*—Pronunciation (the Roman method); Grammar (an exact knowledge of the inflections is essential); Cæsar, the first four books of the *De Bello Gallico;* Cicero, six orations, including *Pro Lege Manilia;* Vergil, the first six books of the *Aeneid*, with Prosody; Prose Composition, Daniell or Collar or Jones, entire.

(*b*) *Greek*—Grammar (Goodwin's preferred) and Prose Composition; or the first 100 lessons of White's Beginner's Greek Book. Reading: The first four books of Xenophon's *Anabasis.* At least two years should be devoted to this work.

(*c*) *French*—The whole subject of French Grammar. Applicants will be expected to read at sight easy French; and to translate correctly into French, simple English sentences. Two years ought to be given to this study, the first year being spent mainly on the Grammar with easy reading; the second devoted to reading good modern French, with grammatical analysis and exercises in writing. The texts read should be chiefly narrative and conversational prose; one or more prose comedies of the nineteenth (*not* the seventeenth) century should be included.

(*d*) *German*—Joynes-Meissner's or Thomas's Grammar is recommended. The essentials in these grammars should have been mastered thoroughly; *i. e.*, declensions of nouns and adjectives, pronouns, comparison of adjectives, prepositions, regular and irregular verbs and essentials of syntax. The following books or their equivalents must have been read (not less than 600 pages). Joynes's or Whitney's Reader; Hillern's Höher als die Kirche; Riehl's Der Fluch der Schönheit; Freytag's Die Verlorne Handschrift, Gerstäcker Irrfahrten.

(*e*) While the preferred requirement is that each candidate shall offer any two of the foregoing languages, he will be permitted to offer in place of one of the two the following group:

1. *Chemistry*—Williams' or Remsen's.
2. *Physiology*—Martin's (briefer course).
3. *English Literature*—Pancoast's Introduction to English Literature and an acquaintance with representative works in each period; or, *English History*, Montgomery.

In addition to the foregoing requirements for admission to the work of the College, *each candidate for a degree* must submit satisfactory evidence that he has successfully pursued a course of study equivalent to the first two years of any course leading to a degree in the College of Arts, Philosophy and Science, of this University. Where this work has been done in a college or university of approved standing, the certificate of said college or university will be accepted. In all other cases the candidate will be subject to examination in such work.

COURSE IN LAW

FIRST YEAR

First Semester	Credit hours	Second Semester	Credit hours
Elementary Law (including Domestic Relations)	15	Agency	2
		Contracts	4
		Criminal Law	3
		Sales	2
		Torts	4
	15		15

TEXT-BOOKS

First Semester — Elementary Law (Robinson, Walker, Tenth Ed., and Blackstone).

Second Semester — Agency (Mechem); Contracts (Bishop); Criminal Law (Hawley); Sales (Tiedeman); Torts (Cooley).

SECOND YEAR

Bailments	3	Construction of Contracts	2
Commercial Law	5	Evidence	2
Evidence	2	Partnership	2
Pleading	4	Pleading	2
Moot Court	1	Real Property	4
		Wills	2
		Moot Court	1
	15		15

TEXT-BOOKS

First Semester — Bailments (Hale); Commercial Law (Tiedeman); Evidence (Greenleaf, Sixteenth Ed.); Pleading (Phillips), and Kinkead's Selections.

Second Semester — Construction of Contracts (Jones); Partnership (Parsons); Real Property (Tiedeman); Wills (Page).

THIRD YEAR

Circuit and Supreme Court Practice	1	Corporations (Private)	2
Constitutional Law / International Law	4	Corporations (Municipal), Negligence of	3
		Ethics	2
		Federal Practice	2
Corporations (Private)	2	Mortgages / Suretyship	2
Corporations (Municipal)	2		
Equity Jurisprudence	4		
Probate Law	2	Trial Practice	2
Moot Court	1	Moot Court	1
	16		14

Thesis for graduation to count for two hours through second semester.

TEXT-BOOKS

First Semester — Constitutional Law (Black); Private Corporations (Taylor); Municipal Corporations (Tiedeman); Equity Jurisprudence; Probate Law (Whittaker's Probate Code).

Second Semester — Ethics (Sharswood); Trial Practice (Kinkead); Negligence of Municipal Corporations (Jones); Suretyship (Baylies).

PURPOSE AND METHODS

It is the purpose of this College to furnish such legal training as will secure the most favorable judgment of the profession, and such as will fit students for practice in any part of the country.

The aim is to teach an accurate knowledge of the principles of the law, and to illustrate the application of these principles to the practical affairs of life—to teach students both to know and to apply the law. The instruction offered includes a Course containing three years of nine months each. It requires about fifteen hours of lecture and recitation work per week each year, and embraces all the elementary and practical studies necessary for admission to the Bar of any State administering the Common Law.

The methods of instruction combine the advantages of all approved systems and appliances—the text-book and recitation system, the lecture system, and the case system. Charts, outlines, analyses, essays, note-taking, oral and written lectures, reviews and examinations are used; and exercises are given in drafting contracts, abstracts, conveyances, wills, protests, mercantile contracts, pleadings, indictments, and other legal papers. Briefs, arguments in moot courts, etc., are required. Attention is given to the study and accurate analysis of leading cases.

GENERAL REGULATIONS

IRREGULAR STUDENTS

In special cases, students who have had part of the studies of the First Year and part of those of the Second Year, or part of those of the Second Year and part of those of the Third Year, may be examined on whatever subjects they may select and may take part of the studies of both years, if the Faculty is satisfied that the applicants can do so to advantage. If candidates for a degree, such applicants must meet all the other requirements and have all the other qualifications of those seeking a degree.

SPECIAL STUDENTS

Persons wishing a knowledge of legal principles *for business purposes only*, but not intending to apply for a degree or to take a full course, may be admitted at any time as special students, and may avail themselves of such advantages of the College as they may deem expedient. Their convenience will not be taken into consideration in arranging classes, and they must make satisfactory arrangements as to fees, hours of recitation, etc., with the Dean.

ENTRANCE EXAMINATIONS

Entrance examinations, except for those seeking a degree, will not be technical; the object being to ascertain the results of previous training and practical capacity to appreciate the technical study of the law.

APPLICATIONS FOR DEGREES

At the time of registration all applicants who seek degrees should present their diplomas and certificates of work done. These certificates should state in detail

the studies pursued, the text-books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination, and the rank or standing of the candidate in it. A copy of the course of study must accompany the certificate in all cases, and must accompany it where equivalents are offered. These statements should also be accompanied by information as to age, occupation, experience, and work done since leaving school. Blanks for application will be furnished on request made to the Dean.

EXAMINATIONS

Examinations are held from time to time to test the student's knowledge of the work he has gone over. They are usually written, but sometimes oral.

THESIS

Each candidate for a degree is required to prepare and deposit with the Faculty, at least six weeks before the end of the year of graduation, a thesis of not less than fifteen hundred nor more than five thousand words, exclusive of citations of authorities, upon some subject selected by himself with the approval of the professor giving instruction in that division of law from which the subject is chosen.

DEGREES

The degree of Bachelor of Laws (LL. B.) will be conferred on all who, being at least twenty-one years of age and having met the requirements necessary for entrance for a degree, pass satisfactorily the examinations at the close of the Senior year, after having done at least the last year's work in the College of Law at the University, and having presented a thesis acceptable to the Faculty.

The degree of Master of Laws will be conferred upon any one who has received the degree of Bachelor of Laws at this University, or other approved University or College, upon completing the studies of the Graduate year, and satisfactorily passing an examination therein, and presenting a satisfactory thesis; the subject of which has been chosen from the field included in the Graduate year.

CERTIFICATES OF WORK DONE

Those who have completed the studies of the College, but have not complied with the requirements for a degree, will be given an official certificate, showing the work done, and signed by the President of the Board of Trustees, the President of the University, and the Dean of the College of Law.

ADMISSION TO THE BAR

The regular Supreme Court examination for the admission to the bar is held on the first Tuesday in June of each year. Seniors are required to take this examination before they can receive the degree or certificate above mentioned.

COURSE OF INSTRUCTION

The Course of Study is three years of nine months, or thirty-six weeks, each; covering about fifteen hundred hours of work. It is so arranged that each class will have an average of three recitations a day, each one hour in length, thereby doing the same amount of work that is done in a regular University course.

MOOT COURT

Second Year and Third Year students will have Moot Court, under the supervision of the Dean, throughout the year, not less than one hour each week. The

object of Moot Court is to give practical insight into the conduct of trials, examination of witnesses, production of evidence, etc.

ADVANTAGES

LOCATION

Attention is called to Columbus as a place in which to study law. Here the Legislature meets. Here are the Supreme Court and Circuit Court; four branches of the Common Pleas Court, in almost daily session throughout the college year; the Probate Court, the County Commissioners, the City Court, the several Magistrates' Courts; also the U. S. Circuit and District Courts. All are easy of access from the College. "There is no place where law is learned so quickly and thoroughly as among the lawyers. No teaching is so effective as the object lessons of the trial of cases in court."

LIBRARIES

The following libraries are accessible to the students:

The Law Library of the College contains the Noble Law Library, the Emerson McMillin Law Library, the Critchfield Law Library, and three sets of the Ohio and the Ohio State Reports; about 3,000 well selected volumes.

The University Library contains 25,000 volumes of very carefully selected books upon all subjects. This is quite complete in the more recent standard works upon history and political science, philosophy, etc. A good collection of the leading scientific, technical and literary magazines and journals is to be found here.

The State Law Library, of about 35,000 volumes—the largest and most complete Law Library in the State. It contains complete sets of the English, Scotch, Irish, Canadian, United States, and State Reports, Statutes and Digests, as well as all the important text books and leading periodicals published. This library is located in the new State Supreme Court building. It is designed wholly for reference, and students are warned that they must not use the library rooms as a study room, and that the text books found here are to be used for reference only. No student is expected, nor will he be permitted, to use these books instead of providing himself with those required in the course.

The State Library, in the State House—a library of general literature, history, science, biography, political and social science, philosophy, etc., comprising some 65,000 volumes. The leading magazines, journals, etc., are also to be found here.

The University Libraries are open from 7:30 a. m. to 9:30 p. m. during the five days in which the University is in session, and on Saturdays from 8 a. m. to 4 p. m. The State Law Library is open six days in the week, from about 8:30 a. m. to 5:30 p. m., with the exception of about an hour or an hour and a half at noon. The State Library is open six days in the week from 9 a. m. to 12 m., and from 2 p. m. to 5 p. m.; and when the Legislature is in session, from 7 p. m. to 9 p. m.

The City Library, with 30,000 volumes and a fine reading room, may also be used by students, under reasonable restrictions.

THE UNIVERSITY COURSES

Attention is called to the great advantage of attending a law school in close and vital connection with the University affording the means of a liberal, practical and technical education. Students who are disposed to work faithfully may, at the same time that they are acquiring a technical knowledge of the law, supplement their general education by joining University classes, in departments which they may elect, subject to the requirements for admission to such departments, without extra charge except for laboratory work. Not alone from the courses in History and Political Science, or from those in Mental and Moral Philosophy, should this

work be selected, but also from the courses in Civil, Mine, Mechanical, and Electrical Engineering, from the courses in Anatomy and Physiology, Economic Geology, etc. To the average practitioner, there will come ten questions involving the principles of surveying or engineering to one of the constitutional law or English history. Not a day passes in the litigation of the courts but that numerous questions of anatomy, physiology, surveying or engineering arise and are to be decided. Particular attention, therefore, is called to the technical courses offered by the University, which will be open to those in the College of Law who are able to take them without interfering with the required law work. The following departments offer courses which will prove beneficial to those who have not had such training as would enable them to take more technical work: Botany, Physiology, Physics, Civil Engineering, Mine Engineering, Chemistry (Toxicology), Geology, Philosophy, History, English.

EXPENSES

Each undergraduate student of the University is required to pay an incidental fee of fifteen dollars a year, and in this College a tuition fee of forty-five dollars; a total of thirty dollars for each semester, which is payable at the beginning of each semester.

Graduate students are required to pay a fee of thirty dollars for the year.

A fee of five dollars (to cover the expenses of graduation, diplomas, certificates, etc.,) is charged to all who receive the diploma or certificate, and a fee of ten dollars is charged to those taking the degree of Master of Laws. These fees must be paid before the degrees are conferred, or certificates delivered.

Good boarding and lodging, convenient to the University, can be obtained at from $3.50 to $5.00 per week.

The text-books used in this College can be obtained at the University at students' prices. The University has no pecuniary interest in these books or the sale of them, and they are permitted to be sold here merely for the convenience of the students.

The books for the first year	$41 00
For the second year	40 00
For the third year	36 00
Total for three years	$117 00

THE COLLEGE OF PHARMACY

FOR ADMISSION TO THE FOUR-YEAR COURSE[1]

The following are the requirements:

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, or equivalents: Shakespeare's *Merchant of Venice, Julius Caesar,* and *Macbeth;* Milton's *Lycidas, Comus L'Allegro, and Il Penseroso;* Burke's *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison;* The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of oll of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Taylor's Academic or equivalent.

4. *Botany*—Kellerman's Elementary Botany and Spring Flora or equivalent.

5. *Civil Government*—Fiske or Thorpe preferred.
Or History—Myers's *General History.*

6. *Geometry, Plane and Solid*—Venable, White, Wentworth, or Wells.

7. *Latin*—Pronunciation (the Roman Method); Grammar (an exact knowledge of the inflections is essential); Cæsar, the first three books of the *De Bello Gallico.*

Or *German*—Joynes-Meissner's or Thomas's Grammar is recommended. The essentials in these grammars should have been mastered thoroughly, i. e., declensions of nouns and adjectives, pronouns, comparison of adjectives, prepositions, regular and irregular verbs and essentials of syntax.

The following books or their equivalents must have been read (not less than 600 pages.) Joynes's or Whitney's Reader; Hillern's Höher als die Kirche; Riehl's Der Fluch der Schöenheit; Freytag. Die Verlorne Handschrift; Gerstäcker Irrfahrten.

For the present, the *German* required for admission may be begun at the University, but without University credits.

8. *Physics*—Carhart and Chute, Gage, Avery, or Appleton.

COURSE IN PHARMACY

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

Degree: Bachelor of Science in Pharmacy

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Chemistry (12) Qualitative Analysis.	5.
Latin (1) Pharmaceutical	5.	Latin (1) Pharmaceutical	5.	Latin (1) Pharmaceutical	5.
or		or		or	
German (1) Elementary.	4.	German (1) Elementary.	4.	German (1) Elementary.	4.
Mathematics (14) Plane Trigonometry.	5.	Mathematics (15), (16) Spherical Trigonometry, Algebra.	5.	Mathematics (17) Plane Analytics.	5.
Rhetoric (5) Paragraph Writing.	2½.	Rhetoric (5) Theme Writing.	2½.	Rhetoric (5) Prose Analysis.	2½.
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

SECOND YEAR

Botany (6a) Systematic, Physiological.	5.	Botany (4) Medical.	2.		
Chemistry (20) Laboratory.	4.	Chemistry (20) Laboratory.	4.	Chemistry (20) Laboratory.	4.
German (2) Scientific Reading.	2.	German (2) Scientific Reading.	2.	German (2) Scientific Reading.	2.
Pharmacy (6) General Processes.	3.	Pharmacy (7) U. S. Pharmacopeia.	5.	Pharmacy (8) Dispensatories, etc.	5.
Physics (11) Mechanics and Heat.	3.	Physics (11) Electricity & Magnetism.	3.	Physics (11) Sound and Light.	3.
				Metallurgy (2) Mineralogy.	3.
Chemistry (21) Advanced Inorganic and Physical.	2.	Chemistry (21) Advanced Inorganic and Physical.	2.	Chemistry (21) Advanced Inorganic and Physical.	2.
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

THIRD YEAR

Pharmacy (9) General Processes.	5.	Pharmacy (10) Prescriptions.	5.	Pharmacy (11) Dispensatories, etc.	5.
Pharmacy (12) Materia Medica.	3.	Pharmacy (13) Materia Medica.	3.	Pharmacy (14) Mat. Medica & Thera.	3.
Physiology (1) Human Anatomy.	3.	Physiology (1) Physiology.	3.	Physiology (1) Physiology.	3.
General Chemistry (8) Organic.	5.	Physiology (8) Bacteriology.	2.	Physiology (5) Microscopy.	2.
		General Chemistry (9) Laboratory.	5.	General Chemistry (9) Laboratory.	5.

FOURTH YEAR

Geology (5) General.	5.	Geology (6) General.	3.	General Chemistry (11) Toxicology.	4.
Pharmacy (15) Assaying.	5.	Pharmacy (16) General.	5.	Pharmacy (17) General.	5.
Thesis.		Thesis.		Thesis.	

Chemistry elective for the year — five hours.
Elective, three hours through the year.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis embodying the results of special study and research. The subject must be within the field of Pharmacy, and must be announced to the President of the University (dependent upon the written approval of the proper authorities) not later than the beginning of the second term of the fourth year of the Course. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

SHORT COURSE IN PHARMACY

FOR ADMISSION

Candidates for admission who are less than twenty-one years of age must be prepared in the common English branches. Teachers' certificates (in force), or credentials from approved schools, will be accepted in lieu of an examination.

FIRST YEAR

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Botany (1) Elementary.	5.
Latin (1) Pharmaceutical.	5.	Latin (1) Pharmaceutical.	5.	Chemistry (12) Qualitative Analysis.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Latin (1) Pharmaceutical.	5.
Pharmacy (6) General Processes.	3.	Pharmacy (7) U. S. Pharmacopeia.	5.	Pharmacy (8) Dispensatories, etc.	5.
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

SECOND YEAR

Botany (6*a*) Systematic, Phys.	5.	Botany (4) Medical.	2.	Chemistry (11) Toxicology.	4.
Chemistry (18) Organic.	5.	Chemistry (18), (19) Organic.	5.	Chemistry (19) Organic, Quantitative.	5.
Pharmacy (9) Phar. Chemistry.	5.	Pharmacy (10) Prescription Practice.	5.	Pharmacy (11) Dispensing Practice.	5.
				Physiology (1) Physiology.	3.
Physiology (1) Human Anatomy.	3.	Physiology (1) Physiology.	3.	Physiology (5) Microscopy.	2.
		Physiology (8) Bacteriology.	2.		
Cadet Service (men).		Cadet Service (men).		Cadet Service (men).	
Hygiene and Physical Training (women).		Hygiene and Physical Training (women).		Hygiene and Physical Training (women).	

COLLEGE OF VETERINARY MEDICINE

FOR ADMISSION[1]

The following are the requirements:

I. For applicants for certificates of Veterinary Surgeon: *Arithmetic*, *Geography* and *Grammar*.

II. For applicants who intend to become candidates for the degree of Doctor of Veterinary Medicine:

1. *Arithmetic, Grammar, and Descriptive and Physical Geography.*

2. *English Composition and Rhetoric*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of two essays of about two hundred words each. The first essay will be upon a subject drawn from the candidate's observation or experience; as "A description of my native town," "The most remarkable person I ever met," "My reasons for seeking a University education." The second essay will be upon a subject drawn from a list of classics which will be furnished on application.

3. *History*—History of the United States, Johnson preferred.

4. *Latin or German*—One year.

5. *Pyhsics*—Gage, Carhart and Chute, Avery, or Appleton.

6. *Botany*—Kellerman's Elementary Botany and Spring Flora or equivalent.

COURSE IN VETERINARY MEDICINE

Note — The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

Degree: Doctor of Veterinary Medicine

FIRST YEAR

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Agr'l Chemistry (1) Principles.	5.	Agr'l Chemistry (8) Organic.	5.	Agr'l Chemistry (9) Applications.	5.
Physiology (1) Human Anatomy.	3.	Physiology (1) Physiology.	3.	Physiology (1) Physiology.	3.
Physiology (4) Histology.	5.	Physiology (4) Histology.	5.	Physiology (4) Phys. Chemistry.	5.
Veterinary Medicine (28) Anatomy.	5.	Veterinary Medicine (28) Anatomy.	5.	Veterinary Medicine (28) Anatomy.	5.
Cadet Service.		Cadet Service.			

SECOND YEAR

Agriculture (8) Breeds of Live Stock.	4.	Agriculture (9) Stock Breeding.	4.	Agriculture (10) Stock Feeding and Hygiene.	4.
Pharmacy (12) Materia Medica.	5.	Pharmacy (13) Materia Medica.	5.	Pharmacy (18) Laboratory.	5.
Veterinary Medicine (14) General Pathology.	4.	Veterinary Medicine Theory & Practice.	5.	Veterinary Medicine Theory & Practice.	5.
Veterinary Medicine Helminthology.	1.	Veterinary Medicine (18) Surgical Diseases.	5.	Veterinary Medicine (18) Surgical Diseases.	5.
Veterinary Medicine (19) Clinic.	12.	Veterinary Medicine (19) Clinic.	12.	Veterinary Medicine (19) Clinic.	12.
Veterinary Medicine (24) General Surgery.	5.				
Cadet Service.		Cadet Service.		Cadet Service.	

[1] An applicant for admission who may be somewhat in arrears in any given subject, will find opportunity to make up this work in the Columbus High Schools, which are fully accredited by the University.

THIRD YEAR

First Term.	Credit hours
Veterinary Medicine Theory & Practice.	3.
Veterinary Medicine (19) Clinic.	12.
Veterinary Medicine (27) Meat Inspection.	4.
Veterinary Medicine (18) Surgical Diseases.	5.
Veterinary Medicine (31) Canine Diseases.	3.
Veterinary Medicine Milk Inspection.	1.

Second Term.	Credit hours
Veterinary Medicine (21) Theory & Practice.	3.
Veterinary Medicine (25) Practice in Operating.	3.
Veterinary Medicine (19) Clinic.	12.
Physiology (6) Bacteriology.	3.
Veterinary Medicine (23) Obstetrics.	3.
Veterinary Medicine (32) Canine Diseases.	3.
Thesis	2.

Third Term.	Credit hours
Veterinary Medicine (22) Therapeutics.	5.
Veterinary Medicine (19) Clinic.	12.
Veterinary Medicine (26) Horse Shoeing.	5.
Veterinary Medicine (33) Opthalmology.	2.
Thesis	2.

THESIS

As a requisite for graduation candidates for the degree of D. V. M. must present an acceptable thesis embodying the results of a special research. The subject must be announced to the President of the University (dependent upon the written approval of the head of the department in which it lies) not later than the beginning of the second term of the third year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

Candidates for a Certificate of Veterinary Surgeon are not required to present a thesis.

THE DEPARTMENTS

The Departments

1900-1901

The subjects set forth under each Department limit and define the administrative authority and responsibility of the head of that Department.

AGRICULTURE

[Townshend Hall]

Professor Hunt, Associate Professor Gibbs, Assistant Professor Decker, Mr. Herrick, Mr. Ruhlen.

8[1]. **BREEDS OF LIVE STOCK.** Lectures and recitations three times a week upon the history, characteristics, adaptation, care and management of the different breeds of domestic animals. Practicum once a week in scoring and judging live stock. First term.

9. **PRINCIPLES OF BREEDING.** Lectures and recitations three times a week upon laws of heredity and their practical applications. Practicum once a week in scoring and judging live stock, and in writing and tracing pedigrees. Second term.

10. **STOCK FEEDING AND HYGIENE.** Lectures and recitations three times a week upon the laws of nutrition, the character of food stuffs, the relation of the food to the animals, and the kind and quantity of food to produce given effects. Practicum once a week in calculating digestibles, nutritive ratios and feeding standards. Third term.

11. **FARM EQUIPMENT.** Lectures and recitations three times a week upon selecting, planning and equipping farms; planning and erecting farm buildings and fences; building roads; farm vehicles and machinery; power, water and drainage. Practicum once a week in drawing plans of farms and farm buildings; leveling and laying drains; dynamometer tests of wagons and farm implements. First term.

12. **SOILS.** Lectures and recitations three times a week upon the origin, formation, kinds, and physical properties of soils, and their improvement by cultivation, fertilization, drainage, and irrigation. Practicum once a week in laboratory testing physical properties of several soils, determining the relation of soils to heat, moisture, air, and fertilizers, and making mechanical analysis. Second term.

13. **FARM CROPS.** Lectures and recitations three times a week upon the history, production, marketing, cultivation, and harvesting of farm crops. Practicum once a week with growing and dried specimens of farm crops, including grasses, clovers, and other forage crops. Third term.

14. **ANIMAL MECHANICS AND EXTERIOR.** Lectures and recitations three times a week upon animal mechanics, proportions, and the relation of the latter to specific uses. Practicum once a week in measuring animals and testing the value of given measurements for given purposes. First term.

[1] These numbers are "finding numbers," and do not necessarily indicate the sequence of topics.

15. **BUTTER MAKING AND CHEESE MAKING.** Recitations twice a week. Laboratory practice two half days each week in running separators, churning and working butter, making cheese, and testing and pasteurizing milk. Second term.

16. **HISTORY OF AGRICULTURE AND RURAL ECONOMICS.** Lectures and recitations upon the history of agriculture; present agricultural methods in various countries; cost and relative profits of various farm operations and systems. Four times a week. Third term.

5. **DAIRY FARMING.** Lectures twice a week upon breeds, and upon feeding, breeding and selecting dairy stock; equipment and management of dairy farms. Practicum once a week in scoring and judging live stock, writing pedigrees, and calculating feeding standards. Second term.

6. **BUTTER MAKING AND CHEESE MAKING.** Practice in running separators, churning and working butter, etc., making cheese and testing and pasteurizing milk. Four half days each week. Second term.

7. **BUTTER MAKING AND CHEESE MAKING.** Lectures and recitations. Two hours each week. Second term.

15. **BUTTER AND CHEESE MAKING.** Lectures twice a week. Laboratory practice twice each week. This course is the same as courses 6 and 7, except that less laboratory practice is taken. Second term.

17. **MILK SANITATION.** Three times a week. First term. Lectures on and laboratory practice in what constitutes pure dairy products.

AGRICULTURAL CHEMISTRY

[Townshend Hall, Rooms 29, 35, 34 and 30]

Professor Weber, Mr. Vinsom

1. **PRINCIPLES OF CHEMISTRY AND CHEMICAL NOMENCLATURE.** Lectures and textbooks for three or four weeks, five times a week; then lectures twice a week on Chemistry of Non-metals, and laboratory practice three times a week. First term.

8. **ORGANIC CHEMISTRY.** Lectures twice a week; laboratory practice three times a week. Second term.

9. **APPLICATION OF CHEMISTRY TO AGRICULTURE.** Lectures twice a week; laboratory three times a week. Third term.

4. **LABORATORY.** Analysis of fertilizers, feed-stuffs, dairy products, fruits, vegetables, alcoholic liquors, etc. Five laboratory periods a week through the year.

7. **CHEMISTRY OF MILK AND MILK TESTING.** Twice a week. Dairy Course.

6. **LABORATORY.** Elective. Five or three times a week through the year.

AMERICAN HISTORY AND POLITICAL SCIENCE

(*See* History.)

ANATOMY AND PHYSIOLOGY

[Biological Hall, Rooms 12 and 20]

Professor Bleile, Assistant Professor Morrey, Mr. Dresbach

COLLEGES OF AGRICULTURE, PHARMACY, AND VETERINARY MEDICINE

1. **HUMAN ANATOMY AND PHYSIOLOGY.** Lectures, recitations and laboratory work three times a week. First, second and third terms. This course must be preceded by, or accompanied with, a course of chemistry.

2. **GENERAL PHYSIOLOGY.** Lectures recitations and demonstrations. Three times a week. Third term. [Short Course in Agriculture.]
3. **CHEMICAL PHYSIOLOGY.** Three times a week. Third term. [Domestic Economy Course.]
4. **HISTOLOGY AND HISTO-CHEMISTRY.** Five times a week through the year. This course must be preceded by, or accompanied with, a course in chemistry.
5. **MICROSCOPY AND URINARY ANALYSIS.** Lectures and laboratory work. Twice a week. Third term.
6. **BACTERIA,** in their relation to Milk, Butter and Cheese. Lectures and laboratory work. Twice a week. Second term.
7. **BACTERIOLOGY.** Three times a week. Second term. [Veterinary Medicine.]
8. **BACTERIOLOGY.** One lecture, one laboratory period, a week. Second term. [Pharmacy.]
9. **PHYSIOLOGICAL LABORATORY.** Three times a week. [May include work in bacteriology.]

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

First Semester

51[1]. **HUMAN ANATOMY AND PHYSIOLOGY.** Lectures, recitations and laboratory work. Three times a week.

53. **PHYSIOLOGICAL LABORATORY.** Three laboratory periods a week.

55. **PHYSIOLOGICAL LABORATORY.** Five laboratory periods a week.

57. **BACTERIOLOGY.** One lecture, one laboratory period a week.

59. **HISTOLOGY AND HISTO-CHEMISTRY.** Laboratory. Five laboratory periods a week.

61. **BACTERIOLOGY.** One lecture, two laboratory periods a week.

Second Semester

52. Continuation of Course 51. Three times a week.

54. Continuation of Course 53. Three laboratory periods a week.

56. Continuation of Course 55. Five laboratory periods a week.

58. **MICROSCOPY.** Lectures and laboratory work. Twice a week. Last half of semester.

60. Continuation of Course 59. Five laboratory periods a week.

62. Same as Course 61.

ANCIENT ART

(*See* Greek Language and Literature.)

ARCHITECTURE

(*See* Drawing.)

[1] "Finding numbers" from 51 upwards always indicate Semester work.

ASTRONOMY

[The Emerson McMillin Observatory.]

Associate Professor H. C. Lord, Director of the Observatory.
Mr. J. Warren Smith, Lecturer on Meteorology.

COLLEGE OF ENGINEERING

4. **ASTRONOMY, GEODESY AND LEAST SQUARES.** Lectures on practical Astronomy, supplemented by practice with the instruments of the Emerson McMillin Observatory. Text-book, Doolittle. Three times a week. (First Term, third year, Course in Civil Engineering.)
5. Continuation of 4. Three times a week. (Second Term, third year, Course in Civil Engineering.)
6. Continuation of 5. Four times a week. (Third Term, third year, Course in Civil Engineering.)

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

61, 62. **GENERAL ASTRONOMY.** Lectures and recitations twice a week throughout the year.

63, 64. **ASTRONOMY AND GEODESY.** Lectures on practical Astronomy, supplemented by practice with the instruments of the Emerson McMillin Observatory. Open to students who have had the Calculus. Text-book, Doolittle. Three times a week throughout the year.

55, 56. **THEORETICAL ASTRONOMY.** Lectures and Observatory practice. The theory of the undisturbed motion of a planet or comet and the calculation of ephemerides. Parabolic orbits from three complete observations. Orbits from three complete observations, including the eccentricity. Work in the Observatory with the twelve-inch equatorial. Definite orbits. Observatory work continued. Authorities: Watson, Klinkerfeus, Appolzer, and the astronomical journals. Five times a week throughout the year.

57, 58. **ASTRO - PHYSICS.** Lectures on the theory of the Spectroscope and its use in Astronomy, supplemented by practice with the large spectroscope of the Observatory. Five times a week through the year.
Astronomy 55, 56, 57, 58 are open only to students who have had Calculus.

60. **METEOROLOGY.** Twice a week. Second half, second semester. Same as 3.

3. **METEOROLOGY.** Lectures on practical meteorology, supplemented by laboratory work in map and chart making, and regular observations with the instruments in use by Weather Bureau. Text-book, Davis; with the daily weather maps issued by the Bureau. Twice a week, third term.

BOTANY

[Botanical Hall]

Professor Kellerman, Mr. Schaffner, Mr. Collett, Miss Dufour

COLLEGES OF AGRICULTURE, PHARMACY AND VETERINARY MEDICINE

1. **ELEMENTARY BOTANY.** Lectures, recitations and field work. Text-book: Kellerman's *Elementary Botany* and *Spring Flora*. Must precede all other courses in this department except course 9. Five times a week. Third term.

4. **MEDICAL BOTANY.** Twice a week, second term. Similar to course 56 in the College of Arts, Philosophy and Science. Rerefence book: Maisch's *Organic Materia Medica.*

6. **PHYSIOLOGICAL BOTANY.** Lectures, recitations and laboratory work. Coulter's Plant Structures. Five times a week. First term.

6*a*. **SYSTEMATIC AND PHYSIOLOGICAL BOTANY.** Lectures, recitations and laboratory work. Coulter's Plant Structures. Five times a week. First term.

7. **PHYSIOLOGICAL AND ECONOMIC BOTANY.** Lectures, recitations and laboratory work. Coulter's Plant Structures. Five times a week. Second term.

8. **VEGETABLE PATHOLOGY.** Lectures, recitations and laboratory work. Five times a week. Third term.

9. **DENDROLOGY.** Lectures, field and laboratory work. Twice a week, first term. Open to students who have not studied Botany.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

First Semester

51. **ECOLOGY AND PHYSIOLOGY.** Lectures and recitations twice a week; laboratory work once a week; credit three hours. Coulter's Plant Relations.

57. **LABORATORY WORK.** Fungi, Algæ, Bryophyta. Two or three times a week.

59. **ADVANCED LABORATORY WORK IN HISTOLOGY AND PHYSIOLOGY** Five times a week. Open to students who have taken Course 51, or 57.

61. **SYSTEMATIC BOTANY, PHENOGAMIC AND CRYPTOGAMIC.** Three to five times a week. Open to students who have taken Course 51, or 57.

63. **MONOGRAPHIC WORK.** Graduate Course. Credit five or ten hours.

65. **RESEARCH WORK IN MORPHOLOGY AND PHYSIOLOGY.** Graduate Course. Credit five or ten hours.

Second Semester

52. **MORPHOLOGY AND CLASSIFICATION.** Lectures and recitations twice a week; laboratory work once a week; credit three hours. Coulter's Plant Structures.

58. Continuation of Course 57. Pteridophyta, Gymnospermæ, Angiospermæ. Two or three times a week.

60. Continuation of Course 59. Five times a week.

62. Continuation of Course 61. Three to five times a week.

64. Continuation of Course 63. Credit five or ten hours.

66. Continuation of Course 65. Credit five or ten hours.

For Summer Courses in Botany, see Lake Laboratory.

CHEMISTRY

[CHEMICAL HALL, Rooms 24, 25, 14, 21, 22, 7 and 18]

Professor McPherson, Professor Norton, Assistant Professor Henderson
Mr. Kohr, Mr. Gore

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

First Semester

51. **ELEMENTARY CHEMISTRY.** Arranged for students who have little or no knowledge of Chemistry. Three sub-divisions; one lecture, one quiz, and three hours' laboratory practice weekly. In the laboratory the student performs an extended series of experiments illustrating the principles of Chemistry. Three hours credit.

53. **QUALITATIVE ANALYSIS.** Laboratory, lectures and quiz. Students familiarize themselves with the properties of the elements with a view to their detection, and then apply this knowledge to analysis of unknown substances. Three to five times a week. This course must be preceded by Courses 51 and 52.

55. **QUANTITATIVE ANALYSIS.** Laboratory, lectures and recitations. Use of the balance and general principles of gravimetric analysis. Drill in the solution problems in quantitative analysis; study of properties of precipitates; principles of volumetric analysis. Selections are made from such analytical methods as best meet the needs of the student. The samples used for analysis are mixtures or commercial products the percentage composition of which is not made known to the student until he has reported his own results. Three to five times a week. This course must be accompanied by course 69.

57. **ORGANIC CHEMISTRY.** Laboratory, lectures and recitations. Open only to students who are familiar with at least the principles of quantitative analysis. Five times a week.

59. **ADVANCED CHEMISTRY.** Laboratory. Arranged for special students who have had courses 53, 54, 55, 56, 57; also course 58 for students in Organic Chemistry. Students are allowed to select such work as they are capable of undertaking—as, the critical examination of analytical methods as well as the study of new methods. Five times a week.

61*a*. **INORGANIC PREPARATION.** Laboratory. This course includes the preparation of inorganic substances from the crude materials. Special attention is given to the preparation of chemically pure compounds, to be used in certain quantitative processes. Thorpe's text-book on Inorganic Preparations is used, and reference is made to Bender and Erdmans' *Anorganische Praeparate* and Krausche's *Pruefung Chemischer Reagientien.* This course must be preceded by quantitative analysis. Four times a week until the Christmas Recess.

Students electing this course must follow with theoretical chemistry and sanitary analysis.

61*c*. **HISTORICAL CHEMISTRY.** Lectures and recitations. A course of twelve weeks beginning after the Christmas Recess. Four times a week. Given biennially, offered in 1900–1901.

63. **CHEMICAL SEMINARY.** Special students will meet to discuss special topics and reviews of current literature. Once a week.

65. **ELECTROLYTIC ANALYSIS.** Laboratory. Extended practice is given in quantitative electrolytic analysis. Twice a week.

69. **ADVANCED GENERAL CHEMISTRY; PHYSICAL CHEMISTRY.** This course includes (*a*) a general survey of inorganic chemistry based upon the arrangement of the elements in accordance with the Periodic Law and (*b*) a discussion of the main principles of physical chemistry and their application to general processes. Twice a week.

Second Semester

52. Continuation of Course 51. Three hours credit.

54. Continuation of Course 53, including use of Spectroscope.

56. **QUANTITATIVE ANALYSIS.** Continuation of Course 55. Three to five times a week. This course must be accompanied by Course 70.

58. **ORGANIC CHEMISTRY.** Laboratory and lectures. Continuation of Course 57. Arranged for students who wish to specialize in organic chemistry. The course includes further preparation of typical organic compounds, their purification and analysis. Five times a week.

60. Continuation of Course 59.

64. Continuation of Course 63.

66. Repetition of Course 55.

68. **SANITARY ANALYSIS.** Laboratory and lectures. A study of the most important chemical methods for the analysis of water and air. This course must be preceded by quantitative analysis, and at least the equivalent of Course 61 in Anatomy and Physiology (bacteriology). The course extends over the last ten weeks of the second semester. Four times a week.

70. Continuation of Course 69.

Students who can elect but one year of Analytical Chemistry, will take Courses 53 and 66. Others will take 53 and 54, then follow with 55, 56 and 57.

COLLEGES OF ENGINEERING AND PHARMACY

7. **ELEMENTARY CHEMISTRY.** Inorganic. Lecture, Laboratory and Quiz. Laboratory work; First Term, experiments upon the non-metals; second term, principles of quantitative analysis. Five times a week.

8. **ORGANIC CHEMISTRY.** Lectures. Five times a week, first term.

9. **ORGANIC CHEMISTRY.** Laboratory and recitations. Five times a week. Second and third terms.

11. **TOXICOLOGY.** Four times a week. Third term.

12. **QUALITATIVE ANALYSIS.** Five times a week. Third term.

13. **QUALITATIVE ANALYSIS.** Three laboratory periods a week. Second term.

15. **SANITARY ANALYSIS.** Laboratory and lectures. A study of the most important chemical methods for the analysis of water and air. Four times a week. Third term.

16. **APPLIED CHEMISTRY.** Lectures on Industrial Chemistry. These are made as practical as possible by visits to different chemical works. When possible specialists deliver lectures on subjects belonging to their particular line of work. Four times a week. Second term.

17. **INORGANIC PREPARATIONS.** This course includes the preparation of chemically pure inorganic substances from the crude materials. Four times a week. Third term.

18. **ORGANIC CHEMISTRY.** Lectures and laboratory. Five times a week. for the first half of the year.

19. **QUANTITATIVE ANALYSIS.** Lectures and Laboratory. Five times a week for the second half of the year.

20. **QUANTITATIVE ANALYSIS.** Laboratory, lectures and recitations. Four times a week.

21. **ADVANCED GENERAL CHEMISTRY; PHYSICAL CHEMISTRY.** Twice a week.

For Courses in the technical analysis of iron, steel and allied products, see the Department of Mining and Metallurgy.

Four Courses dealing with the application of Chemistry to Agriculture, see the Department of Agricultural Chemistry.

CIVIL ENGINEERING

[Hayes Hall, Rooms 14 and 19]

Professor Brown, Assistant Professor Sherman, Mr. Groves

1. **LAND SURVEYING.** Recitations and field work. Johnson's Theory and Practice of Surveying. Six times a week. First term. Second year.

2. **RAILROAD SURVEYING.** Recitations and field work. Searle's Field Engineering. Six times a week. Third term. Second year.

3. **TOPOGRAPHICAL SURVEYING.** Lectures, field work and drawing. Johnson's Surveying used for reference. Four times a week. First term. Third year.

4. **TOPOGRAPHY.** Platting, pen and tinted work. Reed's Topographical Drawing and Sketching. Four times a week. Second term. Second year.

5. **STEREOTOMY.** Recitations, drawing and model cutting. Warner's Stereotomy. Four times a week. Second term. Third year.

7. **BRIDGE STRAINS.** Recitations and lectures. Part I of Dubois's Strains in Framed Structures. Five times a week. Third term. Third year.

8. **BRIDGE DESIGNING.** Lectures and drawing. Part II of Dubois's Strains in Framed Structures and Johnson's Modern Framed Structures used for reference. Five times a week. First term. Fourth year.

10. **SANITARY ENGINEERING.** Lectures. Five times a week. Third term. Fourth year.

14. **CIVIL ENGINEERING LABORATORY.** Cement testing, adjustment of instruments. Twice a week, Second term. Fourth year.

15. **MASONRY CONSTRUCTION.** Recitations and lectures. Baker's Masonry Construction. Five times a week. First term. Fourth year.

16. **HIGHWAYS.** Lectures on roads, streets, canals, railroads and rivers. Five times a week. Second term.
Fourth year students in Civil Engineering must elect either 16 or 17.

17. **RAILWAY LOCATION.** Recitations and lectures. Wellington's Economic Theory of Railway Location. Five times a week. Second term.
Fourth year students must elect either 16 or 17.

18. **WATER SUPPLY.** Recitations and lectures. Fanning's Water Supply. Five times a week. Third term. Fourth year.

19. **TRUSSES.** Lectures and drawing. Five times a week. Third term. Third year, Mine Engineering and Mechanical Engineering.

20. **ROOF TRUSSES.** Lectures and drawing. Five times a week. First term. Third year, Architecture.

21. **SURVEYING.** Recitations and field work. Davies' Surveying. Three times a week. Third term.
Third year, Architecture.

22. **SUMMER COURSE IN FIELD WORK.** The students are taken into camp in a rough, broken country and given a thorough drill in land and elementary railroad surveying. The course begins directly after commencement day, and continues four weeks of six days per week, ten hours per day. The work of the student and the discipline of the camp is in the hands of competent instructors. This course must be preceded by Courses 1, 2 and 4. Students conditioned on any of these courses, may be admitted at discretion of instructor in charge. (At conclusion of second year of course.)

23. **SUMMER COURSE IN FIELD WORK.** Similar to Course 22. Students work on advanced railroad surveying and topographical surveying. This course must be preceded by Courses 3, 22 and 24. Students conditioned in any of these courses may be admitted at discretion of instructor. (At conclusion of third year of course.)

24. **DRAWING OF ENGINEERING STRUCTURES.** Five hours a week. (Second Term, third year, Course in Civil Engineering.)

CLAY WORKING AND CERAMICS

[Orton Hall, Rooms 18, 27, 26 and 25]

Professor Edward Orton, Jr., Mr. Bleininger

1. **CERAMIC CHEMISTRY.** This course is open only to those who have Completed General Chemistry 12. The student begins the quantitative analysis of salts and chemicals, and later works on limestone and other easy materials. Five times a week. (First Term, second year, Course in Ceramics and Short Course in Clay-working.)

2. Continuation of Course 1. The student begins the quantitative analysis of clays and complex minerals, working first on samples of known composition, and later on unknown materials. Five times a week. (Second Term, second year, Course in Ceramics and Short Course in Clay-working.)

3. Continuation of Course 2. The student completes the ultimate analysis of clays and begins the proximate "Rational" analysis of clays and pottery bodies, following the methods of Seger. Five times a week. (Third Term, second year, Course in Ceramics and Short Course in Clay-working.)

4. **LECTURES ON CLAY MANUFACTURE.** (supplemented by frequent recitations). The origin, composition and properties of clays and other minerals employed in the clay, glass and cement industries. Five times a week. (First Term, third year, Course in Ceramics; and second year, Short Course in Clay-working.)

5. Continuation of Course 4. A series of lectures, with recitations, on the general principles of the manufacture of bricks and the coarser clay wares, including the selection and winning of the materials, their preparation, manufacture, burning and testing. Five times a week. (Second Term, third year, Course in Ceramics; and, second year, Short Course in Clay-working.)

6. Continuation of Course 5. A series of lectures, with recitations, on the classification and manufacture of pottery and the finer grades of clay wares, including the selection of the materials, preparation of the bodies, manufacture of the ware, preparation of the glazes, burning and decoration of the wares and the pyrometry of ceramics. Five times a week. (Third term, third year, Course in Ceramics; and, second year, Short Course in Clay-working.)
Course in Ceramics; and, second year, Short Course in Clay-working.)

7. **CERAMIC CHEMISTRY.** Continuation of Course 3. Open only to those who have completed that course. The analysis of glasses and glazes, devoting special attention to the use of hydrofluoric acid in silicate analysis, and to the determination of lead and boracic acid. Five times a week. (Second term, third year, Course in Ceramics.)

9. **LABORATORY WORK IN CERAMICS.** Open only to those who have completed Courses 3 and 6. The student will undertake the production of such wares as are made from single clays; then wares made by blending two or more natural clays; and, then, such wares as are made from an artificial body. In each case the bodies made will be burnt and tested. Five times a week. (First Term, fourth year, Course in Ceramics.)

10. Continuation of Course 9. The student will practice on the production of glasses and glazes, beginning with the natural "slip glazes" and taking successively the soft raw-lead glazes, the fritted lead-boracic-acid glazes, and the hard-fibre leadless porcelain glazes. In each case the glazes will be made for use on some definite body, and will be made to "fit." Five times a week. (Second Term, fourth year, Course in Ceramics.)

11. Continuation of Course 10. The student will practice on the use of the coloring and opacifying oxides in glazes, and on the production of colors for the decoration of pottery, and of body-stains. Five times a week. (Third term, fourth year, Course in Ceramics.)

12. **LECTURES ON CEMENT MANUFACTURE.** The theory of hydraulicity, the compounding, manufacture and testing of natural and Portland cements and hydraulic silicates. Open to students who have had courses 3 and 6. Facilities for laboratory work in making, burning and testing cements will be given. Five times a week. (Second Term, fourth year, Course in Ceramics.)

14. **MINERAL REPORTS.** A series of lectures on the prospecting and opening of mineral properties and ceramic plants. Frequent trips will be made to the important clay-working centers of Ohio for field work and practice in observation. Students will be allowed to specialize along their intended lines. Five times a week. (Third Term, fourth year, Course in Ceramics.)

15. **THESIS.** As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of this study must lie within the field of the degree sought. The subject must be announced to the President of the University (dependent upon the approval of the head of the Department), not later than the beginning of the second term of the fourth year; and the completed thesis must be presented on standard paper of certain size and quality, type-written, bound, and titled, not later than the second Saturday before Commencement Day.

16. **GENERAL PRINCIPLES OF APPLIED CERAMICS.** A series of lectures on the chemical technology of the clay, glass and cement industries. Three times a week. (Third Term, fourth year, Course in Chemistry.)

17. **PRACTICE** in making drawings and specifications for brick kilns, brick dryers, pottery kilns, gas producers, glass pot-furnaces, glass tanks, cement kilns and burning cylinders. Students will be allowed to specialize along the lines they intend to follow. Four times a week. (Second Term, fourth year, Course in Ceramics.)

DOMESTIC ECONOMY

[HAYES HALL, Rooms 1, 3, 10.]

Associate Professor Bowman, Assistant Professor Souther

Domestic Science

1. **FOOD ECONOMICS.** One lecture and three laboratory periods each week. Four hours credit. Lectures embracing a study of the evolution of society as affected by food conditions; second, a study of food principles. Laboratory work includes experimental work with foods, and the preparation and serving of typical foods of certain classes. Offered in the first term of each year.

2. **FOOD ECONOMICS.** One lecture and three laboratory periods each week. Four hours credit. By lecture and research work, the relative nutritive and money values of foods are considered. Each student prepares a weekly dietary for the family; the amount to be expended limited by the instructor. United States Agricultural Bulletin standards used. Laboratory work is a continuation of Course 1. Offered in second term of each year.

3. **EMERGENCY WORK AND HOME NURSING.** One lecture and three laboratory periods each week. Four hours credit. The lectures, demonstrations and practical work are designed to set forth the principles underlying good nursing, to take up the dietetic treatment of various diseases and to consider such emergency cases as frequently require prompt treatment in the home. Food suitable for invalids, infants and convalescents is prepared in the laboratory. Offered in the third term of each year.

4*a*. **PRESERVATION OF FOODS.** Four weeks.

b. **HYGIENE OF CLOTHING.** Eight weeks.

One lecture and three laboratory periods each week. Four hours credit.

(*a*). Includes a brief study of the causes of decomposition, a history of the methods employed in the preservation of foods, and practical work in canning, preserving, etc.

(*b*). Includes a study of fibres and their proper treatment. The properties and cleansing effect of water and soap; disinfecting clothing; the chemical treatment of stains and demonstrated work in practical laundry methods. Offered in the first term.

10. **HOUSEHOLD ECONOMICS.** Two hours lecture course. Elective. A consideration of the best location for a house; its hygienic and sanitary construction and arrangement and approved methods of lighting, heating and ventilating. Offered in the third term of each year.

DOMESTIC ART.

5. **LECTURES** on the Industrial and Artistic Evolution of Society. History of the early race considered with special reference to the development in culture gained through hand-work. Practice work; Preparations of a series of models comprising the different stitches used in plain hand sewing; ornamental stitches and simple embroidery. One lecture and three practice periods each week. Four hours credit. Second term.

6. **LECTURES ON TEXTILES.** Study of fibres; their growth and the processes of manufacture. Comparative economic values of fabrics. Practice work; Machine and hand work on underwear; drafting from simple measurements; designing in pencil; use of patterns; making shirt waists or wash gowns; Simple straw hats and bows. One lecture and three practice periods a week. Four hours credit. First term.

7. **LECTURES ON HISTORIC COSTUME.** Consideration of line, form and color; hygienic and artistic dress; treatment of wool and silk fabrics. Practice work : Drafting patterns by use of Tailoring System. Cutting and fitting. Making wool dress. Making of hat frames, covering and trimming the same. One lecture and three practice periods a week. Four hours credit. First term.

8. **LECTURE AND PRACTICE WORK.** Continuation of Course 7. As much time as possible being given to pencil and water coloring designing of costumes and hats suitable to different wearers. Original designs required to be made and carried out in the case of each individual pupil. One lecture and three practice periods a week. Four hours credit. Second term.

9. **LECTURES ON HISTORY OF DOMESTIC ART AND ARCHITECTURE AND THE APPLICATION OF ART TO MODERN HOUSE DECORATION.** Practice work: Continuation of Course 8. Further work in practical costume making as may be designated by the instructor; the aim being to foster good taste and judgment in the use of expensive and inexpensive materials. Expressions of individuality encouraged but held subservient to general artistic principles, to rules of hygiene and to prevailing modes. One lecture and three hours practice work each week. Four hours credit. Third term.

Note. Individual instruction is given throughout. Pupils are required to furnish all materials except those used in making models of Course 5. A certain amount of work is required to be completed before admittance is given to the next higher grade of work.

DRAWING

[Hayes Hall, Rooms 22, 24 and 37]

Associate Professor Bradford, Assistant Professor French, Mr. Lewis

1. **FREEHAND DRAWING.** Practice and occasional lectures. Pencil, charcoal, pen and water-color drawing from copies, models and plaster casts.
   One drawing period a week, three terms, Industrial Arts.
   Two drawing periods a week, first term, Short Mining and Domestic Economy.
   Two drawing periods a week, first and second terms; all four-year Engineering Courses.
   Three drawing periods a week, three terms, Architecture.

2. **LETTERING.** Practice and occasional Lectures.
   Two drawing periods a week, third term, Industrial Arts, and Short Mining.
   Three drawing periods a week, third term, Ceramics, Civil, Electrical, Mechanical and Mine Engineering, and Architecture.
   This Course must be preceded by Course 1.

3. **MECHANICAL DRAWING.** Lectures or recitations one period a week. Practice two periods a week. All Engineering, Industrial Arts, Architecture. Subjects: Orthographic, Isometric and Oblique Projection and elementary Working Drawings. First term.
   Lectures or recitations two periods a week. Practice one period a week, in Industrial Arts and in all Engineering Courses except Civil Engineering; three periods a week in Civil Engineering and Architecture. Subject: Descriptive Geometry. Second term.
   Lectures or recitations, one period a week. Practice, two periods a week in Engineering Courses; four periods a week in Architecture. Subject: Shades, Shadows and Perspective. Third term, in all four-year Engineering and Industrial Arts Courses and the Course in Architecture. First term in the Short Mining and Domestic Science Courses.
   This Course must be preceded by Course 2.

4. **DRAUGHTING AND BLUE-PRINTING.** Practice and occasional Lectures. Three periods a week, second term. Arranged especially for the students in the Short Mining Course. This Course must be preceded by the first term of Course (3).

5. **TECHNICAL DRAWING.** Lectures and Practice. Rules and methods for working drawings, tracing, blue-printing, machine design and practice in making same to represent form and dimensions for shop use. Three periods a week. First term, Mechanical and Electrical Engineering Courses. This Course must be preceded by Courses (2) and (3).

7. **PHOTOGRAPHY.** Lectures and Practice. Lectures: Optics of Photography, chemistry of photography, exposing and developing, printing, lantern slides, orthochromatic photography and some of the applications of photography. Practice in outdoor, interior, instantaneous and flash-light photography, copying, lantern slides, and printing. Two periods a week. Ceramics, Architecture, first term. Civil, Mechanical and Mine Engineering, third term. The first term of this Course is elective.

8. **MECHANICAL DRAWING.** Lectures and Practice. Geometric and Projection Drawing. Two periods a week, first and second terms, Industrial Arts.

10. **MECHANICAL DRAWING.** Lectures and Practice. Arranged especially for the students in Agriculture. Two periods a week, first term.

11. **MECHANICAL DRAWING.** Lectures and Practice. Arranged especially for the students in Short Course in Ceramics, five periods a week, third term.

12. **CLAY MODELING.** Modeling in Clay and Casting in Plaster, ornamental forms from designs, photographs, nature and original designs. Two periods a week; first, second and third terms.
This Course must be preceded by Course (1).
Domestic Economy Course, second term. Architectural Course, second and third terms. This Course must be preceded by Course (1).

13. **TECHNICAL AND DECORATIVE DESIGN.** Lectures and Practice. Lectures on the principles of decorative design in monochrome, color and relief, and practice in the same. Two periods a week; first, second and third terms.

14. **PEN DRAWING.** Two periods a week, first term. Arranged especially for the Course in Architecture. This Course must be preceded by Course (1).

15. **TECHNICAL DRAWING.** Lectures and Practice. House Designing. Five periods a week, third term. Domestic Economy.

16. **LECTURES AND PRACTICE.** Technical Drawing consisting of the designing and preparation of specifications of structures related to agriculture. Three periods a week, third term.

ART.

An elective course in Art offered by Department of Drawing. Must be preceded by Course 1 in Drawing or its equivalent elsewhere.

17. **LECTURES AND PRACTICE.** Lectures on color standards, color theory, color harmony, color appearances, tone and gradation, atmosphere and values. Practice in color work either water or oil color. First term. Lectures illustrated by lantern slides.

18. **LECTURES AND PRACTICE.** Lectures on objects of art, ideas and subjects, style and individuality, schools of art, great artists including old and modern masters. Illustrated by lantern slides. Practice in water or oil painting from still life. Second term.

19. **LECTURES AND PRACTICE.** Lectures will be a continuation of second term's work and including sculpture and the master sculptors. Illustrated by lantern slides. Practice in water or oil painting from life and nature or clay modeling. Third term. The above is to be offered as an elective for two or three hours as follows: Lecture for one hour and practice for two or four hours as the student has time.

ARCHITECTURE.

4. **SPECIFICATIONS.** Lectures and practice in preparing Specifications for Architectural Structures. Two periods a week. (Second Term, fourth year, Course in Architecture.)
5. **DECORATION AND ORNAMENT.** Lectures on the different styles of carved ornament and decorative color. The practice part of this subject will be incorporated in the clay Modeling and Designing. Three periods a week. (First Term, third year, Course in Architecture.)
6. **ESTIMATES AND SUPERINTENDENCE.** Lectures and practice in preparing estimates for structures designed in Courses 8, 11, 12 and 13, and the duties of superintendence. Four periods a week. (Third Term, fourth year, Course in Architecture.)
7. **HEATING, VENTILATING AND PLUMBING** Lectures and experimental work. Lectures on the principles and methods of heating and ventilating and sanitary plumbing. Experimental work is carried on with the heating and ventilating plants in the different University buildings. Five periods a week. (Second Term, fourth year, Course in Architecture.)
8. **DESIGNING.** Lectures and Practice. Steel skeleton and fire proof construction. Five periods a week. (Second Term, fourth year, Course in Architecture.)
9. **HISTORY OF ARCHITECTURE.** Lectures illustrated by lantern slides. Three periods a week. (First Term, second year, Course in Architecture.)
10. Same as 9. (Second Term, second year, Course in Architecture.)
11. Same as 10. (Third Term, second year, Course in Architecture.)
12. **ARCHITECTURAL DRAWING.** Drawing architectural ornament, details of orders and styles with the special object of impressing upon the student's mind the archictectural characteristics considered in Course 9. Two periods a week. (First Term, second year, Course in Architecture.)
13. Same as 12. (Second Term, second year, Course in Architecture.)
14. Same as 12. (Third Term, second year, Course in Architecture.)
15. **DESIGNING.** Lectures and practice in designing structures adapted to modern requirements. Four periods a week. (First Term, third year, Course in Architecture.
16. **DESIGNING.** Lectures and practice. Two periods a week. (Second Term, third year, Course in Architecture.)
17. **DESIGNING.** Lectures and practice. Four periods a week. (Third Term, third year, Course in Architecture.)
18. **DESIGNING.** Four periods a week. (First Term, fourth year, Course in Architecture.)
19. **DESIGNING.** Four periods a week. (Third Term, fourth year, Course in Architecture.)
20. **THESIS.** Original design, to be accompanied with written description, specifications and estimate. Five periods a week. (Third Term, fourth year. Course in Architecture.)

ECONOMICS AND SOCIOLOGY

[University Hall, Rooms 17 and 18]

Associate Professor Clark.

Course 51 or Course 52 must precede all other Courses.

FIRST SEMESTER

51. **ELEMENTS OF POLITICAL ECONOMY.** A careful study of the laws of production, exchange, distribution and consumption of wealth; combined with an analysis of the industrial actions of men as regards land, labor, capital, money, credit, rent, interest, wages, etc. Text-book, lectures and individual investigations. Four times a week. This Course is repeated in the Second Semester (as Course 52). Students who are required to take the subject, those whose names begin with the letters L to Z will take it in the First Semester; others will take it in the Second Semester (as Course 52).

53. **THE HISTORY OF INDUSTRIAL SOCIETY.** A general view of the evolution of industrial society; and a study of causes and effects of past economic policies together with their bearing on existing conditions; with special reference to England and America. Lectures and assigned readings. Twice a week.

55. **PRACTICAL PROBLEMS IN ECONOMICS.** A rapid study of immigration, money, railroads, crises and tariff. Lectures and collateral readings. Twice a week.

57. **THE TRANSPORTATION PROBLEM.** A study of the development and present economic status of roads, canals and railroads in their relation to industry and to the state. Lectures: Twice a week.
Not offered in 1899–00.

59. **PUBLIC FINANCE AND TAXATION.** This course aims to make the student acquainted with the theory of public revenue and expenditure; and with the leading systems of financial administration throughout the world. Municipal indebtedness and corporate financiering are incidentally treated. Text-book and lectures. Twice a week.
Not offered in 1899–00.

61. **SEMINARY IN ECONOMICS.** Two hours a week at one meeting. All students who elect their Major Study in Economics must take this course in their fourth year. Open, as elective, to other students, graduate and advanced under-graduate, on permission of the instructor.

63. **SOCIOLOGY AND STATISTICS.** Lectures and laboratory work. One hour credit. This course may accompany courses 55, 57, 59 or 65.

65. **COMMERCIAL GEOGRAPHY.** A scientific study of business relations and conditions, domestic and foreign; the sources, quantity and quality of products, and the distribution of the same; trade routes and the means of communication. The Consular Reports will constitute one basis of study. Texts and lectures.

SECOND SEMESTER

52. **ELEMENTS OF POLITICAL ECONOMY.** Text-book, lectures and individual investigations. Four times a week. (This is a repetition of Course 51, and will be taken in the Second Semester by those students (of whom it is required) whose names begin with the letters A to K.)

53. **THE HISTORY AND THEORY OF SOCIALISM.** Lectures and collateral readings. Twice a week.

56. **INDUSTRIAL AND SOCIAL REFORMS.** A study of labor problems, charities and corrections, monopolies, insurance, trusts, etc. Lectures and collateral readings. Twice a week.

58. **MONEY, CREDIT AND BANKING.** This course involves the history and theory of the subject; a comparative study of monetary systems, currency, etc.; together with various methods of banking; national banks, clearing houses, sub-treasury, etc.; and a critical analysis of proposals for reform. Texts, lectures and collateral readings. Twice a week.
Not offered in 1899-00.

60. **INDUSTRIAL AND FINANCIAL HISTORY OF THE UNITED STATES.** A complete survey of American industries, financial resources and policies; public lands, government subsidies, internal revenue, etc.; history and description of the Treasury and Interior Departments, the Mints, etc. Lectures and collateral readings. Twice a week.

62. **SEMINARY IN ECONOMICS.** Two hours a week at one meeting. This is a continuation of Course 61, and is open only to those who have had that course. All students who elect their Major Study in Economics must take this Course in their fourth year. Open, as elective, to other students, graduate and advanced under-graduate, on permission of the instructor.

64. **SOCIOLOGY AND STATISTICS.** A continuation of Course 63. One hour credit. May be taken separately or accompany Courses 56, 58, 60 or 66.
Courses 1 and 2 in the College of Agriculture and Domestic Science are the same as Courses 51 and 52 described above.

66. **COMMERCE AND TRADE.** Theory and practice of business. Standard business forms, commercial paper, stocks and bonds, insurance policies and investment securities of all kinds will be studied with the aid of sample copies. This is an advanced course and should be preceded by four elective courses in the department including Course 60. Required readings and reports on current commercial and financial literature. Lectures.

EDUCATION

[University Hall, Rooms 51 and 54]

Professor Gordy, Mr. Hamilton.

FIRST SEMESTER

51. **ELEMENTARY EDUCATIONAL PSYCHOLOGY.** This course is intended to be helpto three classes of students: (1) Those who are not preparing to teach, but who wish to make some study of education in order that they may perform their duties as members of society more intelligently: (2) Those intending to teach and who wish to study the relations between Psychology and education; and (3) Those preparing to be superintendents and who wish to get suggestions as to the best method of teaching Psychology to teachers. The text used is Gordy's Psychology. Students will be required to do collateral reading and bring in reports of their work. Four hours a week.

53. **HISTORY OF GREEK EDUCATION.** Students of this course will make a study of the history of the education of the Greeks from the time when life was their only school to the time when Greece became the teacher of the world. The connection between Greek life and Greek education will be sharply emphasized; the defects of Greek ideals of life will be shown as reappearing in Greek ideals and methods of education, and these in turn as exerting an influence on Greek life. This course will be essentially a study of Greek civilization, but with the practical purpose of getting light for the solution of our own problems. It is believed that the course will be especially helpful to those preparing to teach history, and the classics. The texts used are Davidson's *Greek Education*, and Davidson's *Aristotle*. Readings are required of students in Greek history and Plato's *Dialogues*. Four hours a week.

55. **THE HERBARTIAN PEDAGOGY.** The object of this course is three-fold: (1) To ascertain what the Herbartian Pedagogy is: (2) To determine its truth, and (3) To consider carefully its applicability—so far as it is true—to the schools of this country. Special attention will be given to these Herbartian theories that are most widely current in this country. The texts used are Herbart's *Science of Education*, De Garmo's *Herbart* and Lange's *Apperception*. Four hours a week.

59. **CHILD STUDY.** An elementary course in the growth and development of children, giving special attention to the pedagogical aspect of the subject. Though arranged primarily for teachers this course treats of subjects of universal interest such as the child as a social factor, function of play, the child and self-government, the child and the race, etc. Open to all students. Twice a week.

67. **EDUCATIONAL VALUES.** This course seeks to determine the capacity of the various subjects pursued in elementary and secondary courses to contribute to true educational ideals. The work is based on Fouillie's *Education from a National Standpoint*. Twice a week.

69. **A STUDY OF SCIENTIFIC METHOD;** intended especially for those preparing to teach Science. Twice a week.

71. **PEDAGOGICAL RESEARCH.** For teachers and advanced students. Various school problems will be taken up for exhaustive study, thus offering opportunity for an insight into the organization of the school not usually open to undergraduate students. The work will be by topics and largely individual. Special facilities for original investigation will be at the command of students showing themselves competent to do such work. As only a small number of students can be accommodated applications for admission should be made as soon as possible. Twice a week.

73. **MODERN EDUCATIONAL SYSTEMS OF EUROPE.** A brief historical and statistical study of secondary education in Germany, France and England. The work will be based upon such texts as Russel's *German Higher Schools*, Holman's *English National Education*, and will consist of recitations and reports upon original topics. Open to all students. Twice a week.

SECOND SEMESTER

52. **MODERN EDUCATIONAL THEORIES.** These theories will be studied from three points of view: (1) As the expression of a certain philosophy of life; (2) from the point of view of their consistency; and (3) from that of their truth. The work is based on Quick's *Educational Reformers*. Twice a week.

54. **PLATO'S REPUBLIC.** This course is essentially seminary work for the benefit of those students of Course 53 who wish to make a critical study of Plato's *Philosophy of Education*. Twice a week.

56. **THE KINDERGARTEN.** This course is intended especially for those who are preparing to do kindergarten and primary work, and to be superintendents of schools. Twice a week.

58. **THE PHILOSOPHY OF EDUCATION.** This course aims to make a systematic exposition of the philosophy of education. Four times a week.

60. **EDUCATION IN THE UNITED STATES.** A comparative study of secondary education in the United States and Europe presupposing Course 73. Twice a week.

68. A continuation of 67. Twice a week.

70. A continuation of 69. Twice a week.

72. **PEDAGOGICAL RESEARCH.** Continuation of Course 71. Open to students credited with 59 or 71. Twice a week.

ELECTRICAL ENGINEERING.

[Electrical Hall, Room 9 and Laboratory.]

Associate Professor Caldwell, Mr. Fish

6. **ELECTRICAL ENGINEERING.** Lectures on direct and alternating circuits, dynamo machinery, transformers, accumulators and applications. Twice a week. (First and Second Terms, third year, Course in Architecture; and fourth year, Courses in Industrial Arts and Manual Training.)

7. **ELECTRICAL ENGINEERING.** Laboratory work on the subjects treated in Course 6, which it accompanies. Twice a week. (First and Second Terms, fourth year, Courses in Industrial Arts, Manual Training, Mining and Mechanical Engineering; Second Term, third year, Course in Architecture; fourth year, Civil Engineering.)

8. **DIRECT CURRENT DYNAMO MACHINERY.** Generators and Motors, their theory, construction and operation. Lectures, recitations and problems. Four times a week. (Second Term, third year, Course in Electrical Engineering.)

9. **ELEMENTARY DYNAMO LABORATORY.** Handling and testing of circuits, generators, motors, accumulators, lamps, etc. Nine actual hours per week. (Third Term, third year, Course in Electrical Engineering.)

10. **ALTERNATING CURRENT CIRCUITS AND MACHINERY.** Generators, transformers, single and polyphase motors, apparatus and systems. Lectures, recitations and problems. Three times per week. (First and Second Terms, fourth year, Course in Electrical Engineering.)

11. **ADVANCED DYNAMO LABORATORY.** Continuation of the work begun in Course 12, together with alternate current apparatus, telephone apparatus, etc. (First and Second Terms, six actual hours. Third Term, with thesis work nine actual hours. Fourth year, Course in Electrical Engineering.)

12. **ELECTRICAL TRANSMISSION AND DISTRIBUTION.** Systems, operation and apparatus. Twice a week. (Second Term, fourth year, Course in Electrical Engineering.)

13. **APPLICATION OF ELECTRICITY.** Brief treatment of the elements of Illumination, Street Railway Work, Telephone, Telegraph, Electro-metallurgy, Mining, etc. The seminary method is used in this course to the extent of each student writing one paper on some assigned subject, and reading the same before the class. Five times per week. (Third Term, fourth year, Course in Electrical Engineering.)

14. **ELECTRICAL DESIGN.** Includes wiring of buildings, Direct and Alternate current generators, transformers, distribution, etc. Eight hours per week in the drawing room. (Second and Third Terms, fourth year, Course in Electrical Engineering.)

ENGLISH LITERATURE

[University Hall, Room 31.]

Professor Barrows, Assistant Professor Taylor

All Courses except 51 and 52 are elective; but no elective is open to one who has not taken, or is not taking 51 or 52. Students, whose major study is in English literature must take 69 and 70, in either the third or fourth year. Biennial courses will alternate as follows: 53 with 61, 54 with 60, 63 with 71, 64 with 72.

FIRST SEMESTER.

51. **AN INTRODUCTION TO ENGLISH LITERATURE.** Four times a week.
Required in the Course of Arts, the Latin Course in Philosophy, and the Course preparatory to the study of Law and Journalism.
Course 51 includes (1) an outline of the history of English literature. For this part of the work Pancoast's "Introduction to English Literature" is covered in three examinations. (2) Lectures on the elements of literary analysis and interpretation. (3) Study of selections characteristic of different authors and of different periods, to secure acquaintance with literary problems, to cultivate perception of literary qualities, and to verify and apply the assertions of the lectures and of the manual. The book first used is Palgrave's "Golden Treasury."

53. **POETRY, FROM SPENCER TO MILTON,** exclusive of the drama. Twice a week. (Omitted in 1899–1900.) Historical and critical lectures; papers and discussions. Required books: "Spenser's Faery Queene" (Kitchin); "Elizabethan Lyrics" (Schilling): "Milton's Poetical Works."

55*a*. **THE ENGLISH BIBLE.** The Pentateuch. Once a week. Given in 1901–'02.

55*b*. **THE ENGLISH BIBLE.** The Histories. Once a week. Given in 1899–1900.

55*c*. **THE ENGLISH BIBLE.** The Gospels. Once a week. Given in 1900–1901.

The study of the Bible is continued through three years. The old authorized version is the text-book; but students must also have, for correction and comment, the revised version.

57. **SHAKSPERE.** Three times a week. Literary study of Shakspere's plays, with no more reference to historical and philological matters than is necessary to an understanding of the text. Various problems of dramatic art are discussed in connection with the plays that best illustrate them.

59. **THE MODERN NOVEL.** Three times a week. (Omitted in 1900–1901.) Lectures, reading and reports.

61. **FROM DRYDEN TO JOHNSON.** Twice a week. (Omitted in 1900–1901.) Lectures, reading and reports. Both prose and poetry will be reviewed in this course.

63. **PROSE, FROM COWPER TO THE VICTORIAN PERIOD.** Three times a week. (Omitted in 1899–1900.) Lectures on the history of thought in this period, on the relations of authors to each other and to the times, and on their literary significance. Critical study of selections from Burke, Coleridge, Landor and the essayists.

65. **MASTERPIECES: A STUDY OF LITERARY TYPES.** Three times a week. This with course 66 constitutes one continuous course. The course covers the whole field of English Literature topically. It is designed for graduates, but is open to undergraduates who have taken two elective courses in this department. The study is of literary types, their origin and development, the best examples in English being chosen for basis; the types will include the drama, the epic, the idyll, the lyric, and in prose the novel, the short story and the essay. The whole will be based upon Aristotle's "Poetics" and the theory of ideal literature; and will include lectures, readings and essays.

67 **CHAUCER.** Twice a week. The Prologue to the Canterbury Tales, and the most important of the tales will be read. The Morris-Skeat edition of the Prologue, and Skeat's edition of Chaucer's Works are required.

69. **LITERARY PROBLEMS.** Twice a week. A series of topical studies. Lectures and illustrative readings drawn from the entire range of our literature; reports and discussions.

Required in the third or fourth year of students whose major study lies in this department.

71. **VICTORIAN LITERATURE — PROSE.** Three times a week. (Omitted in 1900–1901.) Victorian prose, centering on the essayists,—Ruskin, Newman, Arnold, Pater, Stevenson, Lectures, readings and reports.

SECOND SEMESTER.

52. **AN INTRODUCTION TO ENGLISH LITERATURE.** Four times a week.

Required in the Modern Language and English Courses in Philosophy and in the Course in Commerce and Administration. See description of Course 51, of which this is a repetition.

54. **PROSE, FROM SIDNEY TO MILTON.** Twice a week. (Omitted in 1899–1900.) Lectures on the intellectual life, and the political, religious, and social problems of the period as they affected its literature; papers and discussions. Required books: Bacon's "Essays and Advancement of Learning" (Selby); Browne's "Religio Medici" (Camelot Classics); Cowley's "Essays" (Cassel's National Library); Fuller's "Wit and Wisdom" (R. T. S. Library). Sidney, Taylor and others will be investigated in the library.

56*a*. **THE ENGLISH BIBLE.** Course 55*a* continued. Given 1901–1902.

56*b*. **THE ENGLISH BIBLE.** The Psalms and Prophets. Once a week. Given in 1899–1900.

56*c*. **THE ENGLISH BIBLE.** The Acts and Epistles. Once a week. Given in 1900–1901.

The study of the Bible is continued through three years. The old authorized version is the text-book; but students must also have, for correction and comment, the revised version.

58. **THE DRAMA — FROM THE MIRACLE PLAYS TO THE CLOSING OF THE THEATRES.** Three times a week. Lectures on the Mysteries, the Moralities, the Interludes, the Rise of the Regular Drama, Shakspere and his Predecessors, Contemporaries and Successors. Select plays will be read by the class.

60. **THE DR MA — SINCE THE RESTORATION.** Twice a week. (Omitted 1900–1901.) Lectures, readings and reports.

62. **AMERICAN AUTHORS.** Three times a week. (Omitted 1900–1901.) Lectures, readings and reports.

64. **POETRY — FROM COWPER TO THE VICTORIAN PERIOD.** Three times a week. (Omitted in 1899–1900.) Lectures on the rise of the romantic spirit, on the history of thought in this period, and on the relation of the poets of the times and to current problems. Study of selections from Cowper, Burns, Wordsworth, Shelley and Keats.

66. **MASTERPIECES: A STUDY OF LITERARY TYPES.** Three times a week. Course 66 is a continuation of Course 65 and must be preceded by 65. See description of Course 65.

68. **THE GREAT TRANSLATIONS.** Twice a week. (Omitted in 1899–1900.) This is a graduate course, for the discussion of various problems of universal literature, and the investigation of the indebtedness of English to other literatures. Undergraduates must obtain permission to take this course.

70. **LITERARY PROBLEMS.** Twice a week. A continuation of Course 69, and required of students whose major study lies in this department.

72. **VICTORIAN LITERATURE — POETRY.** Three times a week. (Omitted 1900–1901.)

ENTOMOLOGY

(*See* Zoology and Entomology)

EUROPEAN HISTORY

(*See* History)

GENERAL CHEMISTRY

(*See* Chemistry)

GEOLOGY

[Orton Hall, Rooms 1, 5, 4, 7 and 13]

Professor Orton, Associate Professor Prosser, Associate Professor Bownocker.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE.

FIRST SEMESTER.

53. **PALEONTOLOGY.** Careful training in systematic classification which may be used in the philisophical study of the development of plant and animal life, or as a means of becoming acquainted with the faunas and floras that characterize the various geological formations.

At first the student devotes some time to conchology, studying recent shells in which the characters used in classification are well preserved, and after this preliminary work, fossils are studied. Fossils afford the most reliable data for identifying and correlating geologic formations, and the critical study of faunas is a field especially adapted to independent research.

Laboratory, museum and field work. Two to five hours credit.

55. **PETROGRAPHY 1.** Laboratory and Lectures. Optical crystallography, with practical determination of rock-forming minerals, macroscopically and microscopically. Study of the igneous rocks in the hand specimen and thin section. Twice a week. The Sturtz rock collection and Voight Hochgesang thin sections of typical minerals and rocks will be carefully studied. Books of reference:—Mitchel Levy—*Les Minneaux des Roches;* Rosenbusch—*Mikroscopische Physiographie der Petrographisch Wichtigen Mineralien,* 3d ed.; *Mikroscopische Physiographie der Massigen Gesteine,* 2d ed.; Teall's *British Petography;* Spottiswoode's *Polarization of Light.* Prerequisites; Chemistry, 51 and 52; Metallurgy, 52 (Mineralogy and Crystallography).

59. **FIELD GEOLOGY.** Field and laboratory study of the geological formations readily accessible from Columbus. This course is intended to acquaint the student with the ordinary methods of field investigation, and involves the collection and identification of specimens, the measurement of geologic sections and the preparation of a report describing the region studied. Two to five hours credit.

61. **COSMICAL GEOLOGY.** Lithological Geology, Dynamic and Structural Geology. Books of reference used in preparation of the work: Green's Physical Geology, Geike's Text-book of Geology, LeConte's Elements of Geology, Hunt's Chemical Geology, Daubree's Geologic Experimentale. Three times a week.

63. **PHYSIOGRAPHY.** Study of the features of the earth's surface with special reference to North America; the agencies producing these features and geographical changes now in progress. Recitations, lectures, map-work, field excursions. Books used in preparation of work: Standard Works on Physical Geography; Russel's Rivers of North America; Lakes of North America; and Glaciers of North America; Shaler's Aspect of the Earth; Wright's The Ice Age of North America; The National Geographic Magazine; Maps of the Mississippi River Commission, etc. Twice a week.

SECOND SEMESTER.

54. Continuation of Course 53. These two Courses may be continued through a second year.

56. Continuation of Course 55. Twice a week.

58. **GEOGRAPHIC GEOLOGY.** The origin, development and destruction of topographic forms. Rivers, lakes, oceans, ice, and winds as agents modifying the surface of the earth. The great ice age in North America. [Primarily for teachers.]

Books of reference: Journal of Geology; American Geologist; The Great Ice Age; (Geike's) The Ice Age in North America; (Wright) The Reports of the United States Geological Survey; The Maps of the Mississippi River Commission, etc. Three hours per week. Lectures, recitations, map work. Third term.

60. **AREAL GEOLOGY.** Instruction in the methods of preparing geological maps and reports. The student compiles from a geological report a map with sections showing geologic structure, and later traces the outcrops and prepares a geological map of some region. Two to five hours credit.

62. **HISTORICAL GEOLOGY.** A general course in paleontological and stratigraphical geology with excursions and laboratory study of the Ohio Geological Reports and characteristic fossils. The development of organisms and the classification and distribution of the geological formations are considered. Continuation of Course 61. Lectures and recitations three hours.

64. Continuation of Course 63. Twice a week.

COLLEGES OF AGRICULTURE, ENGINEERING AND PHARMACY.

2. **GENERAL GEOLOGY.** Structural, historical and dynamical geology. Three hours lectures and recitations and four laboratory and field work. In the laboratory. Dana's Manual of Geology, the Ohio Geological Reports and characteristic fossils will be studied. In the field, specimens will be collected, sections measured, formations identified and the student will be given an idea of the methods of work pursued by a field geologist. Credit five hours. First term.

5. **ECONOMIC GEOLOGY.** The common minerals and rocks composing the earth's crust, their alteration and decomposition. Soils, their origin and classification; the soils of the United States and especially those of Ohio. Fuels: Coal, oil and gas. Building stones, limes and cements. Iron and the most useful metals. Three hours. Second term. Lectures and laboratory work.

1. **PHYSIOGRAPHY.** The probable origin of the earth and its relation to other heavenly bodies. The features of the earth's surface and the agencies producing these. The atmosphere, climate, etc. Oceans, rivers and lakes. Recitations, lectures and map work. Five hours. Third term.

5. **GENERAL GEOLOGY.** Structural, Historical and Dynamical Geology. Three hours lectures and recitations and two hours laboratory and field work. In the laboratory the Ohio Geological Reports and characteristic fossils will be studied. In the field, sections will be measured, formations identified, specimens collected and the student given an idea of the method of work pursued by a field geologist. (Required in the first and second term of fourth year in the Long Course.)

6. **ECONOMIC GEOLOGY.** Lectures, Economic materials of stratified rocks, clay, limes, cements, coals, iron ores, phosphates, petroleum, etc. Economic materials derived from veins and igneous rocks, gold, silver, copper, mercury. Gems. Books of reference used by students in preparation of their work: Publications of U. S. Geological Survey, State Geological Surveys, Phillips' Ore Mining. Three times a week. (Required in second term of fourth year in Long Course.)

1. **PHYSIOGRAPHY.** Recitations, lectures, map work. The probable origin of the earth and its relations to other heavenly bodies. The features of the earth's surface and the agencies producing these. The atmosphere, climate, etc. Oceans, rivers and lakes. Five hours. Third term, first year. Short Courses in Mining, Clay-working; and second year, Short Course in Industrial Arts.

4. **ELEMENTARY GEOLOGY.** Recitations, lectures, laboratory work. Lithological, dynamical, structural and historical geology. Five hours. (Second term, second year, Short Course in Mining.)

5. **GENERAL GEOLOGY.** Structural, historical and dynamical geology. Three hours lectures and recitations and four hours laboratory and field work. In the laboratory Dana's Manual of Geology, the Ohio Geological Reports and characteristic fossils will be studied. In the field specimens will be collected, sections measured, formations identified and the student given an idea of the methods of work pursued by a field geologist. Credit five hours (First term, fourth year, Course in Architecture, Ceramics, Civil and Mining Engineering; and second year, Short Course in Clay-working.)

6. **ECONOMIC GEOLOGY.** Lectures and assigned reading. Economic materials of stratified rocks, clays, limes, cements, coals, iron ores, phosphates, petroleum and gas. Economic materials derived from unstratified rocks—gold, silver, copper, mercury, etc. Three hours. (Second Term, fourth year, Courses in Architecture, Ceramics, Civil and Mining Engineering; and second year, Short Course in Clay-working.)

7. **PETROGRAPHY.** Lectures and laboratory work. The ingenious, sedimentary, and metamorphic rocks,—their origin and classification. The volcanic rocks of the western United States,—their composition, structure and alteration products. The object of this course is to give the student a practical acquaintance with rocks. Two hours. (Second Term, fourth year, Course in Mining Engineering.)

GERMAN LANGUAGES AND LITERATURES

[University Hall, Rooms 32 and 33]

Professor Eggers, Associate Professor Mesloh

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

FIRST SEMESTER

51. **ELEMENTARY GERMAN.** Four times a week.

53. **SCIENCE READING.** Twice a week.

55. **INTERMEDIATE GERMAN.** Lectures upon outline of German Literatrue. Reading of selections. Four times a week.

57. **THE GERMAN DRAMA.** Lectures and reading of Selections. Three times a week.

59. **FAUST I.** Twice a week. (Can be taken only by those who propose to take 60.)

61. **MIDDLE HIGH GERMAN.** Mediæval Epics. Twice a week.

63. **DEUTSCHER AUFSATZ.** Original compositions in German. Once a week.

65. **COLLOQUIAL EXERCISES.** For advanced students. Twice a week.

67. **GOTHIC.** Wright's Primer. The relation between Gothic and allied languages will be considered. Twice a week.

59. **OLD NORSE.** Lectures on Grammar and Reading of Sagas.
The last two courses will alternate.

71. **SANSKRIT.** Perry's *Primer.* Lectures introductory to the study of Indo-Germanic philology.

73. **MODERN GERMAN DRAMA.** Critical study of contemporary dramatists, Hauptmann, Sudermann and others, with references also to the dramas of Ibsen and other dramatists of Germanic countries. Lectures and reading. Composition. After 1901 this course will alternate with 57. Three hours a week.

75. **PHONETICS.** Lectures. The course is intended to give the student a knowledge of the various sounds of language and of the relations between them. One hour a week.

SECOND SEMESTER

52. Continuation of Course 51. Four times a week.

54. Continuation of Course 53. Twice a week. Courses 53 and 54 must have been preceded by Courses 51 and 52.

56. **GERMAN LITERATURE.** Lectures and reading of Selections. Four times a week. Course 55 must have been preceded by Courses 51 and 52.

58. **THE GERMAN PROSE.** Lectures and reading of Selections. Three times a week. 57 and 58 must have been preceded by 51, 52, 55 and 56.

60. **FAUST II.** Twice a week.

62. **MEDIÆVAL LYRICS.** Twice a week.

64. **DEUTSCHE KULTURGESCHICHTE.** Once a week.
Courses 59, 60, 61, 62, 63 and 64 can be taken only with the approval of Professor Eggers; and must have been preceded by Courses 51, 52, 55 and 56, or their equivalents.

66. **COLLOQUIAL EXERCISES.** For advanced students. Twice a week.

68. **OLD HIGH GERMAN.** Lectures on Grammar and Literature. Reading of Selections. Twice a week.

70. **COMPARATIVE GRAMMAR.** Lectures. Twice a week.
The last two courses will alternate.

72. Continuation of Course 71.

74. **MODERN GERMAN PROSE.** Lectures and reading. The great contemporary writers of prose in Germany will be discussed. Some of their critical and philosophical works will be read. References will be made to the great prosaists of other Germanic countries. This course will alternate after 1901 with 58. Three hours a week.

COLLEGE OF AGRICULTURE, ENGINEERING AND PHARMACY

1. **ELEMENTARY.** Four times a week, through the year.
2. **SCIENCE READING.** Twice a week, through the year.
4. **GERMAN LITERATURE.** Four times a week, through the year.
5. **SCIENCE READING.** Four times a week. Open to those who have completed Course 1 or its equivalent. Required of all students who offer German as their entrance language.

GREEK LANGUAGE AND LITERATURE

[University Hall, Room 37]

Prrofessor Smith, Associate Professor Hodgman

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

ELEMENTARY GREEK. White's *First Greek Book* and one or two books of Xenophon's *Anabasis.* This course is designed to meet, partially, the wants of those who are deficient in the Greek required for admission. It cannot receive University credit. Five times a week, through the year.

FIRST SEMESTER

51. **XENOPHON'S HELLENICA.** Books I, II (Manatt). Greek Prose Composition. Herodotus, Book VII. Four times a week.
53. **LYSIAS,** Select Orations (Morgan.) Attic Antiquities. Homer's *Iliad* (Seymour). Four times a week
59. **LECTURES ON HISTORY OF ANCIENT ART.** Twice a week.
(Given biennially. Not offered in 1900–1901.)
61. **THE ATTIC DRAMA.** Lectures, collateral readings and quiz. Twice a week.
63. **LECTURES ON THE HISTORY OF MEDIÆVAL AND MODERN ART.** Twice a week.
(Given biennially. Not offered in 1901–1902.)
65. **LYRIC POETRY.** Selections from the Greek Lyric Poets. Twice a week.

SECOND SEMESTER

52. **HERODOTUS** (continued). Myers's History of Greece. Homer's *Odyssey* (Perrin). Four times a week.
54. **HOMER'S ILIAD** (continued). Plato's *Apology of Socrates, Crito,* and selections from *Phaedo.* Four times a week.
60. **LECTURES ON HISTORY OF ANCIENT ART.** Continuation of Course 59. Twice a week.
(Given biennially. Not offered in 1900–1901.)
62. **THE ATTIC DRAMA.** Continuation of Course 61. Rapid reading of two or three plays. Twice a week.
64. **LECTURES ON MEDIÆVAL AND MODERN ART.** Continuation of Course 63, Twice a week.
(Given biennially. Not offered in 1901–1902.)
68. **GREEK PRIVATE LIFE.** Lectures, illustrated by photographs and lantern-slides. Twice a week.

CLASSICAL PHILOLOGY

Courses 69–70. **HISTORICAL GRAMMAR.** These courses include lectures upon such topics as: The Indo-European family of languages; alphabets and pronunciation of Greek and Latin; accent and its effects as seen in vowel weakening, syncopation, etc.; vowel graduation; inflection of noun and verb; Grimm's Law and the associated laws; the passage of Latin into French and thence into English, etc. The courses include, also, the study of selected inscriptions, of a portion of Quintilian, Book I, and assigned reading in such manuals as Giles's Comparative Philology, and Thompson's Palæography. Twice a week through two semesters.
(Given biennially. Not offered in 1901–1902.)

HISTORY

AMERICAN HISTORY

[University Hall, Rooms 27 and 18]

Professor Knight, Dr. J. B. Sanborn

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

Course 55 (or 56) must precede all other courses in American History. All students intending to take advanced courses in American History should take English History (European History 153 and 154, Department of European History) as early as possible in their course.

FIRST SEMESTER

55. **POLITICAL HISTORY OF THE UNITED STATES.** Lectures, text-books, prescribed readings and topical reports. Hart's Formation of the Union; Wilson's Division and Reunion. Four times a week. This course is repeated in the Second Semester (as Course 56). Of students who are required to take this subject, those whose names begin with the letters from A to K will take it in the first semester; others will take it in the second semester (as Course 56). Two sections.

61. Seminary for Research Work in American History and Political Science. Two hours a week (at one meeting).
In 1900–1901 all fourth year students, who elect their Major Study in the departments of American History and Political Science must take this course. Open, as elective, to other students, graduate and advanced undergraduate, on permission of the instructor.

63. **AMERICAN COLONIAL HISTORY.** The political and social development of the American Colonies, the growth of colonial self-government and of the idea of union. Lectures, assigned readings and special reports. Three times a week.
(Given biennially. Not offered in 1900–1901.)

65. **CONSTITUTIONAL AND POLITICAL HISTORY OF THE UNITED STATES.** 1850–1876. Secessions, Civil War and Reconstruction; a study of the causes and the effects of the downfall of slavery. Lectures and assigned readings. Three times a week.
Given biennially. Offered in 1900–1901.)

71. **HISTORICAL MATERIAL AND ITS USE.** Lectures on elementary historical bibliography and the use of American historical documents, with practical exercises. Especially designed for students intending to do advanced work in American history and political institutions. Once a week.

All students electing their Major Study in the department of American History and Political Science are expected to take this course in their third year. Open as elective to others on permission of the head of the department.

73. **TERRITORIAL DEVELOPMENT OF THE UNITED STATES.** 1789–1850. Growth of the United States, the acquisition and settlement of new territories, and the effect of those territories on the life of the nation. Lectures and assigned readings. Twice a week.

56. **POLITICAL HISTORY OF THE UNITED STATES.** Lectures, text-books, prescribed readings and topical reports. Hart's Formation of the Union; Wilson's Division and Reunion. Four times a week. (This is a repetition of Course 55 and will be taken in the second semester by those students (of whom it is required) whose names begin with letters from L to Z.) Two sections.

62. **SEMINARY FOR RESEARCH WORK IN AMERICAN HISTORY AND POLITICAL SCIENCE.** Two hours a week (at one meeting).

This is a continuation of Course 61, and is open to those only who have had Course 61. In 1900–1901 all fourth year students electing their Major Study in the department of American History and Political Science must take this course. Open, as elective, to other students, graduate and advanced undergraduates, on permission of the instructor.

64. **CONSTITUTIONAL AND POLITICAL HISTORY OF THE UNITED STATES.** The Formative Period, 1776–1815. An advanced course covering the organization and establishment of the United States as a nation. Lectures, assigned readings and special investigations. Three times a week.

(Given biennially. Not offered in 1900–1901.)

66. **AMERICAN DIPLOMATIC HISTORY.** History of the foreign relations, policy and treaties of the United States. Lectures and special investigations. Three times a week.

(Given biennially. Offered in 1900–1901.)

72. **TOPICAL RESEARCH IN AMERICAN HISTORY.** The preparation of special topics on the basis of the work of Course 71. Some special period of American History will be taken up each year. Once a week.

Open to those who have had Course 71. All students electing their major study in the department of American History and Political Science are expected to take this course in their third year.

74. **TERRITORIAL DEVELOPMENT OF THE UNITED STATES, 1850-1900.** A continuation of Course 73. Particular attention will be paid to the country west of the Mississippi, and to the growth of American interests in the Pacific. Lectures and assigned readings. Twice a week.

COLLEGE OF ENGINEERING

56. **POLITICAL HISTORY OF THE UNITED STATES.** Lectures, text-books and prescribed reading. Hart's *Formation of the Union;* Wilson's *Division and Reunion.* Two sections. Four times a week. (Last half Second Term and Third Term, third year, Courses in Industrial Arts and Manual Training.)

COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE

5. **POLITICAL HISTORY OF THE UNITED STATES.** Lectures, text-books and prescribed readings. Hart's *Formation of the Union;* Wilson's *Division and Reunion.* Four times a week during the first term and the first half of the second term. Two sections. The aim of this course is to give the student such knowledge of the political history of the United States as shall make for intelligent citizenship and a clearer understanding of current political conditions.

EUROPEAN HISTORY

[University Hall, Rooms 7, 17, 36]

Associate Professor Siebert

Courses 151 and 152, in the order named, must precede all other courses in European History, except Courses 153, 154 and 157.

FIRST SEMESTER

151. **GENERAL HISTORY OF EUROPE TO THE CLOSE OF THE MIDDLE AGES.** Lectures, text-book and collateral readings. Adams, Civilization during the Middle Ages. Three times a week. Two sections.

153. **POLITICAL AND CONSTITUTIONAL HISTORY OF ENGLAND TO THE ACCESSION OF THE STUARTS.** Lectures, text-book and assigned readings. Gardiner's Student's History of England. Three times a week.

155. **HISTORY OF EUROPE FROM 1789 TO 1815.** The French Revolution. Lectures, recitations and collateral reading. Stephen's Europe, 1718–1815. Three times a week.

157. **ROMAN HISTORY AND INSTITUTIONS.** Lectures and text-book. Pelham, History of Rome. Twice a week.

159. **HISTORY OF EUROPEAN COLONIES.** A study of colonial development of Portugal, Spain, England, the Netherlands, France and Germany during the fifteenth, sixteenth and seventeenth centuries. Lectures, collateral readings and special reports. Twice a week.
Omitted in 1900–1901.

161. **HISTORY OF FRANCE TO THE MIDDLE OF THE EIGHTEENTH CENTURY.** Lectures, assigned readings and special reports. Given biennially. Omitted in 1900–1901.

SECOND SEMESTER

152. **GENERAL HISTORY OF EUROPE FROM THE MIDDLE AGES TO THE PRESENT TIME.** Lectures, text-book and collateral reading. Schwill's History of Modern Europe. Three times a week. Two sections.

154. **POLITICAL AND CONSTITUTIONAL HISTORY OF ENGLAND FROM THE ACCESSION OF THE STUARTS TO THE PRESENT TIME.** Lectures, text-book and assigned readings. Gardiner's Student's History of England. Three times a week.

156. **HISTORY OF EUROPE SINCE 1815.** Lectures, text-book and assigned readings. Fyffe's Modern Europe. Three times a week.

158 **HISTORY OF THE PERIOD OF THE PROTESTANT REFORMATION.** Lectures and text-book. Hauser's Era of the Reformation. Twice a week.

160. **HISTORY OF EUROPEAN COLONIES.** History of colonization by the important States of Europe during the eighteenth and nineteenth centuries. Lectures, collateral reading and special reports. Twice a week.
Omitted in 1900–1901.

162. **DOCUMENTARY AND BIBLIOGRAPHICAL STUDIES IN EUROPEAN HISTORY.** Lectures, readings and criticism of documents, and investigations. Given biennially.
Omitted in 1900–1901.

HORTICULTURE

[Horticultural Hall]

Professor Lazenby, Mr. Price.

1. **ELEMENTS OF HORTICULTURE.** Lectures, text-book and laboratory work in garden, orchard and green-house. A study of the principles of plant growth and culture, preparation of soil, drainage and irrigation, weeds and insects. Four times a week. First term.

a. **GREENHOUSE, CONSTRUCTION AND MANAGEMENT.** A study of the different types of plant houses, including methods of heating, ventilating and watering. The vegetable forcing house, and the crops grown therein. Lectures, recitations and laboratory work in greenhouse. Four times a week. Second term.

b. **PLANT PROPAGATION.** The theory and practice of multiplying plants by seeds, cuttings, divisions, layers, budding and grafting. A study of special garden crops, including fertilizers, tools and implements. Practice in transplanting, pollinating and the use of insecticides and fungicides. Lectures and laboratory work in garden and orchard. Four times a week. Third term.

5. **VARIETIES OF FRUIT.** A study of the history, characteristics, adaptation and general qualities of orchard and garden fruits, including their commercial and food value. Practice in judging and scoring apples, pears, peaches, grapes, citrous and nut fruits. Lectures, recitations and laboratory exercises. Four times a week. First term.

6. **PRINCIPLES OF FRUIT CULTURE.** A study of the location, tillage and fertilizing of fruit lands; the selection of varieties, laying out and planting of fruit grounds; the care of fruit plantations, including diseases, insects and fungi; spraying and the use of insecticides and fungicides; harvesting, preserving and marketing fruit. Lectures and recitations four times a week. Second term.

7. **SMALL FRUIT CULTURE.** A study of the varieties and methods of culture of the small or bush fruits. Practice in cross-pollinating, judging and scoring of small fruits; the relation of bees and birds to horticulture; insect enemies; fungus diseases and the theory and practice of spraying. Lectures, recitations and laboratory work in garden and orchard. Four times a week. First term.

8. **ELEMENTS OF FLORICULTURE.** A study of the origin, history, classification, general characteristics and development of ornamental plants. Lectures and laboratory work. Twice a week. First term.

9. **COMMERCIAL FLORICULTURE.** A study of the propagation and culture of ornamental plants, including the general management of plant houses, the marketing of cut flowers and bedding plants. Lectures, recitations and laboratory work. Twice a week. Second term.

10. **AMATEUR OR HOME FLORICULTURE.** Including the study of window gardening and general management of house plants; the out-door flower garden and treatment of flower beds and borders. Lectures, recitations and laboratory work. Twice a week. Third term.

11. **ARBORICULTURE.** A study of native and introduced trees and shrubs; their use for timber, ornament, shade, shelter and hedges; methods of propagation and culture. Lectures and field work. Twice a week. First term.

12. **FORESTRY AND SYLVICULTURE.** A study of the influence of forests upon soils, crops and climate; forestry in Europe; value of trees for timber; establishment and management of small plantations of forest trees; how to improve and extend existing woodland. Lectures and laboratory work. Twice a week. Second term.

13. **LANDSCAPE GARDENING.** A study of the art of producing picture-like or landscape effect; the making of lawns, walks and drives, and the correct planting of trees, shrubs and flowers for the external adornment of home and public grounds. Lectures and practice. Twice a week. Third term.

INDUSTRIAL ARTS AND SHOPWORK

[Hayes Hall, Rooms 9, 12, 17, 18, 5 and 6]

INDUSTRIAL ARTS

Professor Sanborn, Mr. Knight, Mr. Renck, Mr. Crowe, Mr. McIntire

1. **TOOLS, MACHINES.** Lectures and recitations on hand and machine tools and the principles of mechanism and mechanics underlying their design, construction and operation. Three times a week.

2. **DESIGNING.** Problems in drawing and design to accompany Course 1. Three drawing periods a week.

3. **SHOP EQUIPMENT. APPLIANCES AND MANAGEMENT.** A continuation of Course 1. Lectures and recitations on the strength and durability of the materials used in construction; shop and factory buildings and their construction; power, power transmission and prime movers; automatic machines and other special devices for turning out cheap and accurate work: methods of compensation and shop accounts and management. Three times a week.

4. **ADVANCED DESIGNING.** Problems in the design of buildings and the arrangement of machinery, line-shafting, etc., for manufacture plants; to accompany Course 3. Three drawing periods a week.

5. **WORKSHOPS AND APPLIANCES.** Lectures and problems on the construction of shop buildings and the arrangement of machinery; power required and the means of transmission: friction in line-shafting and the efficiency of machinery: automatic machines and special shop appliances. Three times a week.

6. **MACHINE DESIGN.** Application of the principles of mechanics and strength of materials to the problems of machine designing. Five times (ten hours' practice) a week.

SHOPWORK

1. **CARPENTRY AND PATTERN MAKING.** Exercises and practice in carpentry, wood-turning and pattern making, including sawing, planing, mortising, splicing, framing and other work involving the use of the ordinary carpenter tools; center and chuck turning; the making of finished patterns; and enough elementary moulding to illustrate draft, parting, cores, etc.

2. **FORGING.** Exercises and practice in iron and steel forging, including such operations as drawing, bending, forming, upsetting, welding and the making and tempering of punches, drills, chisels, lathe tools and springs.

3. **FOUNDRY WORK.** Exercises and practice in tempering sand and preparing moulds of machine parts in the sand, core-making, melting iron and brass, and the pouring of castings.

4. **CHIPPING AND FILING.** Exercises and practice in vise work, including chipping in cast and wrought iron; surface filing, squaring, fitting, finishing, and the scraping of surface plates.

7. **CARPENTRY AND PATTERN MAKING.** Similar to Shopwork 1.

8. **CARPENTRY: CABINET WORK.** Exercises and practice in cabinet making including panelling, mitre and dovetail joints, etc.; use of power tools.

9. **ADVANCED PATTERN MAKING.** Continuation of pattern work of Shopwork 7.

11. **FORGING.** Similar to Shopwork 2.

12. **ADVANCED FORGING.** Tool making, tempering of taps, dies, cutters, etc.; annealing; case hardening; ornamental iron work, etc.; visits to shops.

13. **MACHINE WORK.** Exercises and practice in hand-turning in iron and brass on speed lathes; and straight and taper turning, boring, fitting, chucking, thread-cutting, etc., on engine lathes.

14. **MACHINE WORK.** Exercises and practice on the lathe, planer, shaper, drill press and milling machine, with use of small tools as drills, taps, dies, reamers, counterbores, etc.; construction of parts of actual machines.

15. **ADVANCED MACHINE WORK.** Exercises and practice on turret lathe, universal, surface and tool grinding machines, gear cutting, etc.

16. **ADVANCED MACHINE WORK.** The construction and use of jigs and templates; the accurate laying out of work; the duplication of parts, the production of work rapidly and economically, etc.

17. **ADVANCED MACHINE WORK.** The making and use of special tools and fixtures, standard plugs and collars, standard caliper and limit guages; error limits in modern machine construction; methods of testing the accuracy of machine tools; etc.

SHOPWORK REQUIRED

Number	Credit	Year	Term	Courses in
3	2	2	1	M. E.: I. A. (short).
	3	2	1	I. A.: Man. Tr.
4	2	2	1	E. E.
	3	3	1	I. A.: Man. Tr.
	3	2	1	I. A. (short).
	3	2	2	M. E.
	2	1	3	Clay-work (short).
	2	2	3	E. M.
	3	4	1	Cer.
7	3	1	1	I. A. (short).
	3	2	1	Chem.: I. A.: Man. Tr
	2	2	1	E. M.
	4	1	3	E. E.: M. E.
8	5	2	3	I. A.: Man. Tr.
9	3	2	2	I. A.: Man. Tr.
	3	1	2	I. A. (short).
11	2	2	1	E. E.
	3	2	1	M. E.
11	2	2	2	E. M.
	3	2	2	Chem.: I. A.: Man. Tr.
	3	1	3	Clay-w'k (short): I. A. (short)
	3	2	3	Mining (short).
	3	3	3	Cer.
12	3	2	3	I. A.: Man. Tr.
13	3	2	2	E. E.
	3	3	2	I. A.: Man. Tr.
	5	2	2	I. A. (short).
	3	2	3	M. E.
14	3	3	1	M. E.: E. E.
	3	3	3	I. A.: Man. Tr.
15	3	4	1	I. A.: Man. Tr.
	4	3	2	M. E.
	5	2	3	I. A. (short).
16	3	4	2	I. A.: Man. Tr.
17	3	4	3	I. A.

LATIN

[University Hall, Rooms 29, 28 and 39]

Professor Derby, Associate Professor Hodgman, Assistant Professor Elden

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

Courses 51, 52, 53, and 54 in the order named must precede the Elective Courses 55, 56, 57, 58, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78.

FIRST SEMESTER

51. **LIVY — BOOKS XXI AND XXII; TERENCE**—*Pharmio.* Four times a week.

53. **HORACE** — *Odes;* **CATULLUS** — *Selections;* **TACITUS** — *Agricola.* Four times a week.

55. **ROMAN HISTORIANS** —**TACITUS** — *Historiae;* **SUETONIOUS.** Three times a week.

57. **ROMAN PHILOSOPHY.** Three times a week. (Not offered in 1900–1901.)

59. **PHARMACEUTICAL LATIN.** Five times a week.

61. **LINGUISTICS AND INSCRIPTIONS.** Two times a week. (Not offered in 1900–1901.)

63. **TEACHERS' COURSE.** Two times a week.

65. **ROMAN RHETORIC AND ORATORY.** Three times a week.

67. **GREEK AND ROMAN ANTIQUITIES.** Lectures, illustrated. Two times a week.

69. **CICERO'S PHILOSOPHY.** *Tusculanae Disputationes, De Finibus.* Three times a week.

71. **LATIN LITERATURE.** Once a week.

73. **ROMAN POLITICAL AND LEGAL ANTIQUITIES.** Once a week.

75. **LATIN WRITING.** Twice a week.

77. **LATIN PROSEMINARY.** Three hours a week.

SECOND SEMESTER

52. **EARLY LATIN COMEDY** — **PLAUTUS** — Mostellaria: **CICERO** — *Selected Letters.* Four times a week.

54. **PLINY'S** *Letters;* **TIBULLUS, PROPERTIUS, OVID.** Four times a week.

56. **ROMAN SATIRE.** Three times a week.

58. **JUVENAL. MARTIAL.** Three times a week.

60. **PHARMACEUTICAL LATIN** — Continuation of Course 59. Five times a week.

62. Continuation of Course 61. Two times a week.

64. Continuation of Course 63. Two times a week.

66. **LATER LATIN WRITERS.** Three times a week.

68. **GREEK AND ROMAN ANTIQUITIES.** Lectures, illustrated. Two times a week.

70. **SENECA,** *Selections;* **PLAUTUS,** two plays. Three times a week.

72. Continuation of Course 71. Once a week.

74. Continuation of Course 73. Once a week.

76. Continuation of Course 75. Twice a week.

78. Continuation of Course 77. Three hours a week.

COLLEGE OF PHARMACY

1. **PHARMACEUTICAL.** Five times a week. First, second and third terms.

LAW

[University Hall]

FIRST YEAR

FIRST SEMESTER

Elementary Law (Robinson, Walker and Blackstone).

SECOND SEMESTER

Agency (Mechem); Contracts (Bishop); Criminal Law (Hawley); Sales (Tiedeman); Torts (Cooley).

SECOND YEAR

FIRST SEMESTER

Bailments (Hale); Commercial Law (Tiedeman); Evidence (Underhill or Greenleaf); Pleading (Phillips).

SECOND SEMESTER

Construction of Contracts (Jones); Partnership (Parsons); Real Property (Tiedeman); Wills (Schouler).

THIRD YEAR

FIRST SEMESTER

Constitutional Law (Black); Private Corporations (Taylor); Municipal Corporations (Tiedeman); Equity Jurisprudence (Fetter).

SECOND SEMESTER

Ethics (Sharswood); Insurance (Richards); Negligence of Municipal Corporations (Jones); Suretyship (Baylies.)

MATHEMATICS

[University Hall, Rooms 39, 41, 43 and 45]

Professor Bohannan, Associate Professor McCoard, Assistant Profesor Arnold, Assistant Professor Swartzel, Mr. Rasor, Miss Ball

A. TERM COURSES

1. **ELEMENTARY ALGEBRA.** *Venable.* Five times a week. First term (Short Course in Agriculture.)
3. **PLANE GEOMETRY.** *Venable.* Five times a week. First or second terms.
3*a*. **PLANE GEOMETRY.** *Venable.* Five times a week. Second term. (Short Courses in Agriculture and Clay-working.)
13. **SOLID GEOMETRY.** *Venable.* Five times a week. Second term.
14. **PLANE TRIGONOMETRY.** *Loney.* Five times a week. First or third terms.

15. **ANALYTICAL AND SPHERICAL TRIGONOMETRY.** *Loney*, with notes on Spherical Trigonometry. Twice a week. Second term.

16. **COLLEGE ALGEBRA.** *Taylor.* Three times a week. Second term.

17. **PLANE ANALYTICS.** *Loney.* Five times a week. Third term.

18. **ANALYTICS AND DIFFERENTIAL CALCULUS.** *Loney, Venable, Edwards.* Five times a week. First term.

19. **DIFFERENTIAL CALCULUS.** *Edwards.* Five times a week. Second term.

20. **INTEGRAL CALCULUS.** *Edwards.* Five times a week. Third term.

11. **DIFFERENTIAL EQUATIONS.** *Edwards.* Once a week. First term.

8. **LEAST SQUARES.** *Merriman.* Twice a week. First term.

B. SEMESTER COURSES

FIRST SEMESTER

55. **PLANE TRIGONOMETRY** (*Loney*) and 57, **ALGEBRA**, (*Taylor*). Five times a week.

59. **ANALYTICS** (*Loney, Venable*) and 61, **DIFFERENTIAL CALCULUS** (*Edwards*). Five times a week.

63. **ADVANCED MATHEMATICS.** Topics will be changed from year to year to meet the wishes of the students. Selections may be made from the following courses: (a) Advanced Calculus (*Picard Houel*); (b) Differential Equations (*Johnson, Murray, Forsythe, Craig*); (c) Higher Plane Curves (*Salmon*); (d) Advanced Analytical Geometry (*Casey, Salmon*); (e) Analytical Geometry of Three Dimensions (*Chas. Smith, Frost, Salmon*); (f) Theory of Equations (*Burnside and Panton*); (g) Modern Higher Algebra (*Chrystal Salmon, Serret, Cole's Netto*); (h) Modern Geometry (*Cremona, Reye, Steiner, Von Staudt, Chasles*); (i) Determinants (*Muir*); (j) Elliptic Functions (*Weber, Halphen, Durege, Hermite, Greenhill, Briot and Bouquet*); (k) General Theory of Functions (*Forsythe, Harkness and Morley, Tannery, Weierstrass, Durege, Thoame, Biermann*); (l) Potential Functions (*Clausius, Riemann, Dirichlet, Peirce*); (m) Mathematical Theory of Electricity (*Mascart and Joubert*); (n) Higher Geodesy (*Clarke, Helmert, Jordan*); (o) Spherical Harmonics (*Byerly, Ferrers, Heine*); (p) Mathematical Optics; (q) History of Mathematics. Credit, one to ten hours.

65. **PROBLEMS ON ALL PAST WORK.** Once a week.

67. **ALGEBRA, ANALYTICS, CALCULUS.** Three times a week. Taylor's College Algebra.

SECOND SEMESTER

56. **ALGEBRA** (*Taylor*), and 58, **PLANE ANALYTICS** (*Loney*). Five times a week.

60. **CALCULUS** and 62, **DIFFERENTIAL EQUATIONS** (*Edwards.*) Five times a week.

64. Continuation of Course 63. Credit, one to ten hours.

66. Continuation of Course 65. Once a week.

68. **TRIGONOMETRY, ANALYTICS, CALCULUS.** Three times a week. Lyman and Goddard's Trigonometry.

MECHANICAL ENGINEERING

[HAYES HALL, Room 12; MECHANICAL HALL, Second Floor]

Professor Magruder, Associate Professor Hitchcock, Mr. Hale, Mr. Grate

3. **MECHANISM.** Lectures and recitations on the principles of mechanism and mechanical movements. Five times a week. (Second Term, third year, Mechanical and Electrical Engineering Courses.)

The accurate laying out of movements, embodying the principles of mechanism. Twice a week. (Third Term, third year, Course in Mechanical Engineering.)

6. **ANALYTICAL MECHANICS.** Five times a week. (First and Second Terms, third year, Courses in Architecture, Ceramics, and Civil, Electrical, Mechanical and Mining Engineering.)

7. **STRENGTH OF MATERIALS.** Recitations and lectures on the elastic and ultimate resistance of the materials of engineering to stress and their use in structures and machines. Lectures on elementary hydraulics and the flow of water through orifices and pipes over weirs, and in streams, and on measuring the same. Five times a week. (Third Term, third year, same as 6.)

12. **EXPERIMENTAL ENGINEERING LABORATORY.** Twice a week. (First Term, third year, Course in Mechanical Engineering.)

14. The same. Four times a week. (Second Term, fourth year, Course in Mechanical Engineering.)

15. The same. Three times a week. (Third Term, fourth year, Course in Mechanical Engineering.)

17. The same. Three times a week. (Second Term, fourth year, Course in Civil Engineering.)

18. **MACHINE DESIGN.** Recitations on Unwin's Machine Design, with lectures on American Practice. Five times a week. (First and Second Terms, fourth year, Course in Mechanical Engineering.)

19. **MACHINE DESIGN.** Practical applications of the principles of machine design. Five drawing periods a week. (Third Term, fourth year, Course in Mechanical Engineering.)

21. **THESIS WORK.** Five times a week. (Third Term, fourth year, Course in Mechanical Engineering.)

22. **TIMBER AND MASONRY.** Lectures on the construction of foundations and structures in timber and masonry. Five times a week. (The last three-fifths of Second Term, third year, Courses in Mechanical Engineering and Industrial Arts.)

23. **MATERIALS OF CONSTRUCTION.** Lectures on the materials used in architecture and building construction, and laboratory exercises on their properties. Four times a week. (First Term, fourth year, Course in Architecture.)

24. **EXPERIMENTAL ENGINEERING LABORATORY.** Three times a week. (First and Second Terms. Elective to third and fourth year engineers.)

35. The same. Five times a week. (Third Term, fourth year, Courses in Civil and Mining Engineering.)

27. The same. Five times a week. (First Term, fourth year, Course in Mechanical Engineering.)

28. The same. Twice a week. (Third Term, third year, Course in Electrical Engineering; First Term, fourth year, Course in Industrial Arts; and Third Term, Course in Manual Training.)

29. The same. Three times a week. (First Term, fourth year, Course in Electrical Engineering.) Twice a week. (Second Term, fourth year, Course in Industrial Arts.)

30. The same. Twice a week. (Second Term, fourth year, Course in Electrical Engineering; Third Term, fourth year, Course in Industrial Arts.)

31. **HYDRAULIC MACHINERY.** Recitations and lectures on pumping machinery. Three times a week. (Third Term, fourth year, Course in Mechanical Engineering.)

32. **MECHANICAL ENGINEERING AND POWER PLANTS.** A descriptive study of steam and gas engines, boilers, pumps, injectors and other machinery used in plants generating power. Five times a week. (Third Term, third year, Courses in Mechanical and Electrical Engineering; Third Term, fourth year, Courses in Industrial Arts and Manual Training.)

33. **STEAM ENGINES AND BOILERS.** A detail study of steam using and steam generating machinery. Five times a week. (First Term, fourth year, Courses in Mechanical and Electrical Engineering.)

34. **THERMODYNAMICS.** Lectures and recitations on the transmutations of heat and mechanical energies in steam, gas and air engines, and in air and ammonia compressors, together with a study of the tests of ideal and actual engines and of their indicator diagrams; the flow of gases through pipes and orifices. Five times a week. (Second Term, fourth year, Course in Mechanical Engineering.)

METALLURGY AND MINERALOGY

[Chemical Hall, Rooms 4 and 3]

Professor N. W. Lord, Mr. Somermeir

COLLEGE OF ENGINEERING

2. **MINERALOGY.** Lectures. Similar to Course 52 in College of Arts, Philosophy and Science, but more practical, and arranged so as to be preparatory to Determinative Mineralogy (Course 3). Three times a week. Third term.

3. **DETERMINATIVE MINERALOGY.** Laboratory course in practical determination of minerals by physical and chemical tests. Each student is furnished with a set of apparatus, and works under an instructor's inspection. Brush's *Determinative Mineralogy* is used as a manual. Five times a week. Third term.

4. **METALLURGY.** A course of lectures upon fuel and its uses, iron and steel, copper, lead, gold and silver, their properties, tests, ores and details of the modes of reduction. The lectures are supplemented by a careful study of references to standard works and journals. Five times a week. First and second terms.

5. **METALLURGICAL LABORATORY.** Lectures and laboratory work. Laboratory practice in the analysis of iron and steel, fuel and slags, and the assays of lead, copper and zinc ores by wet methods, using approved methods as practiced in technical laboratories of metallurgical works. Course 5 must be preceded by Agricultural Chemistry, Courses 1, 8, 9; or by General Chemistry, Courses 7 and 12. Five laboratory periods a week. Three terms.

6. **ASSAYING.** Laboratory work. Practical work in the assaying of gold, silver and lead ores, by furnace methods. Oral instruction, with reference to standard books on assaying. Five laboratory periods a week. Second term.
7. **METALLURGICAL CONSTRUCTION.** Practice in the designing of furnaces and other metallurgical machinery, including detail drawings and estimates. Three times a week. First term. (Professors Lord and Ray.)
8. **ORE DRESSING AND COAL WASHING.** Lectures. Instruction in the methods of concentrating and enriching ores and fuels by mechanical means. Lectures with reference to Rittinger's *Aufbereitung;* Callon's *Course d' Exploration des Mines;* Kunhardt's *Ore Dressing*, and various papers in technical journals. Twice a week. First term.
9. **MINERAL CHEMISTRY.** Lectures and laboratory practice. Lectures upon fire damp, mine explosions, explosives, boiler, waters, poisonous gases, iron ores; iron and steel, their properties and modes of manufacture; coal and coke. Five hours a week. Third term.

MILITARY SCIENCE AND TACTICS

[Armory]

Major J. M. Burns, U. S. A., Retired

1. **MILITARY DRILL.** Three times a week through the year.
2. **TACTICS.** Lectures and recitations. Twice a week. Second term.
3. **ART OF WAR.** Lectures and recitations. Twice a week. Second term.

MINE ENGINEERING.

[Chemical Hall, Room 26]

Associate Professor Ray

ELEMENTARY ALGEBRA. (Mathematics 2.) Wentworth. Five times a week. Three terms.

1. **MINE SURVEYING.** Lectures and field practice. This is similar to Course 4, but more elementary. The same text is used. The students have more practice in the drawing-room. Five times a week. First term.
2. **VENTILATION AND HAULAGE.** Lectures illustrated by experiments and maps of mines and models when possible, tests by safety lamps and anemometers, and solution of air distribution in coal mines. Five times a week. Second term.
3. **MINE OPERATING.** A course of lectures and practical instruction in mine book-keeping and accounts, cost of working, etc., particularly adapted to Ohio coal mining. Five times a week. Third term.
4. **MINE SURVEYING.** Field Practice in the use of instruments for surface and underground surveys. Full notes are taken, and maps and plans made in the drawing-room. Davie's *Surveying*, by Van Amringe, is used as a text-book. Five times a week. First term.
5. **MINE ENGINEERING.** Lectures. Mine operating, mining machinery, ventilation, shaft-sinking, working out deposits, etc. Constant reference is required to the standard works and to the leading technical journals, with practice in designing mine plants, draughting and estimates. Five times a week through the year.
6. **PLANS AND SPECIFICATIONS.** Five times a week. Third term. [Professors Lord and Ray.]

PHARMACY

[Chemical Hall, Rooms 13 and 12]

Professor Kauffman, Assistant Professor Landacre, Assistant Professor Dye

6. **PHARMACY.** General pharmaceutical processes. Lectures three times a week. First term.
7. **PHARMACY.** United States Pharmacopeia official preparations. Lectures twice a week. Laboratory practice daily. Second term.
8. **DISPENSATORIES.** Official preparations. Lectures twice a week. Laboratory practice daily. Third term.
9. **PHARMACEUTICAL CHEMISTRY.** Unofficial preparations. The National Formulary. Lectures twice a week. Laboratory practice daily. First term.
10. **EXTEMPORANEOUS PHARMACY.** Prescription practice. Lectures once a week. Laboratory practice three times a week. Second term.
11. **GENERAL PRACTICE.** Lectures twice a week. Dispensing practice daily. Prescription practice daily. Third term.
12. **MATERIA MEDICA.** Official drugs and classification. Three times a week. First term.
13. **MATERIA MEDICA.** Official and unofficial drugs. Three times a week. Second term.
14. **MATERIA MEDICA AND THERAPEUTICS.** Snythetic Products. Poisons and Antidotes. Three times a week. Third term.
15. **PHARMACEUTICAL ASSAYING.** Three times a week. First term.
16. **METHODS OF MANUFACTURE.** Three times a week. Second and third terms.
17. **GENERAL PHARMACY.** Two lectures, three laboratory periods a week. Through the year.
18. **LABORATORY.** Special work for veterinary students. Five times a week. Third term.

PHILOSOPHY

[University Hall, Rooms 33, 50, 49 and 51]

Professor Scott, Mr. Hamilton

FIRST SEMESTER

51. **GENERAL PSYCHOLOGY.** Logic Begun. Four times a week. Required in the Courses for B. A., B. Ph. (L), and B. Ph. (M. L.)
53. **GENERAL PSYCHOLOGY.** Three times a week. Required in the Courses for B. Ph. (E.), B. Sc., for Law and Journalism.
55. **ETHICS.** Three times a week. Required in Course for B. Ph. (E.).
57. **HISTORY OF ANCIENT AND MEDIÆVAL PHILOSOPHY.** Three times a week. Elective after Courses 51 and 52.
59. **INTRODUCTION TO PHILOSOPHY.** Twice a week. Elective after Courses 51, 52, 56 and 57 or after Courses 53, 54, 55 and 56.
61. **PHYSIOLOGICAL AND EXPERIMENTAL PSYCHOLOGY.** Twice a week. Elective. This course begins with a general survey of the organic basis of personality, attention, etc., taking up in turn the sense organs and perception, motor processes and the personal equation.
63. **LEADING WORKS IN PHILOSOPHY.** Twice a week. Elective on the same conditions as Course 59.

SECOND SEMESTER

52. **LOGIC COMPLETED, ETHICS.** Four times a week. Follows Course 51.

54. **LOGIC.** Three times a week. Follows Course 53.

56. **HISTORY OF MODERN PHILOSOPHY.** Three times a week. Required after Course 55. Also elective after Courses 51 and 52.

60. **METAPHYSICS.** Twice a week. Elective after Courses 51, 52, 57 and 56 or after Courses 53, 54, 55 and 56.

62. **PHYSIOLOGICAL AND EXPERIMENTAL PSYCHOLOGY.** Twice a week. Elective. The work of this semester presupposes Course 61. Individual topics will be assigned and the student will be required to report upon the general literature of the subject as well as to make an experimental study of some of the controverted points.

64. **LEADING WORKS IN PHILOSOPHY.** Twice a week. Elective on the same conditions as Course 60.

PHYSICS

[University Hall, Rooms 10, 14, 23 and 24]

Professor Thomas, Assistant Professor Boyd, Mr. Kester

COLLEGES OF AGRICULTURE, ENGINEERING AND PHARMACY

1. **ELEMENTARY PHYSICS.** Recitations and experimental lectures. Five times a week. First and Second Terms. Text: Carhart & Chate's "Elements of Physics." (Required in all Short Courses.)

2. **MECHANICS AND HEAT.** Electricity and Magnetism, Sound and Light. Lectures and recitations. Three times a week. Through the year.

3. **PHYSICS.** Extension of Course 2, with practice in solution of problems. Twice a week. Through the year.

4. **ELECTRICITY AND MAGNETISM.** Lectures and recitations. Three times a week First term. (Third year, Electrical Engineering).

5. **PHYSICAL LABORATORY.** Elementary manipulation. Length, mass and time measurements. Work in density, elasticity and heat. Three times a week. Second and third terms.

6. **PHYSICAL LABORATORY.** Theory and practice of magnetic and electrical measurement, including the testing and standardizing of instruments; conductivity of conductors; insulation, capacity and resistance of insulated conductors and cables; temperature co-efficients; commercial measuring and testing instruments; strength and distribution of magnetic fields, magnetic moments, permeability: work in light including optical constants; spectroscopy; photometry of gas, electric and other lights. Five times a week. First, second and third terms. (Third year, Electrical Engineering.)

7. **PHYSICAL LABORATORY.** Two to three times a week. Through the year. Course 7 must be preceded by Course 2.

9. **PHYSICAL LABORATORY.** A second year's work in the Physical Laboratory. Three times a week, with five hours' credit. Course 9 must be preceded by Course 7.

The work in the Physical Laboratory begins with exercises in length, mass and time measurement, making use of scales, tapes and bars, micrometer screws, micrometer microscopes, the dividing engine, the cathetometer, the balance, chronometers, chronoscopes, etc. This course is intended to give the student facility in the use of instruments and knowledge of the theory of their construction and adjustment.

The determination of various physical constants follows, with elementary exercises in heat, light, electricity and magnetism; after which the student takes up such advanced work as his taste and skill permit. The experimental work is accompanied by instruction in methods and in the discussion of results.

11. **MECHANICS, SOUND AND HEAT.** One lecture, two laboratory periods a week. Required in the Course in Pharmacy.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

FIRST SEMESTER

51. **MECHANICS, HEAT, ETC.** Three times a week. Second year. Science Course. Elective in the first year of the Courses of Arts and Philosophy.

53. **MECHANICS, SOUND AND HEAT.** One lecture, two laboratory periods a week. Elective in the First year of the Courses of Arts and Philosophy.

55. **LABORATORY.** Three to five times a week.

57. **LABORATOXY.** Three to five times a week. Course 57 must be preceded by Course 55.

59. **THEORETICAL PHYSICS.** Five times a week. Lectures and assigned readings. Graduate and advanced undergraduate course.

61. **LABORATORY.** Five hours a week. To be preceded by Courses 55, 56, 57 and 58.

SECOND SEMESTER

52. **ELECTRICITY, MAGNETISM, ETC.** Three times a week. Follows Course 51.

54. **ELECTRICITY, MAGNETISM, ETC.** One lecture, two laboratory periods a week. Follows Course 53.

56. **LABORATORY.** Continuation of Course 55.

58. **LABORATORY.** Continuation of Course 57.

62. **THEORETICAL PHYSICS.** Five times a week. Follows Course 59.

64. **LABORATORY.** Five hours a week. Continuation of Course 61.

PHYSIOLOGY

(*See* Anatomy and Physiology)

POLITICAL ECONOMY

(*See* Economics)

POLITICAL SCIENCE

[University Hall, Room 27]

Professor Knight

(All Courses in Political Science must be preceded by History 55 or 56)

FIRST SEMESTER

51. **INTERNATIONAL LAW.** Lectures and text-book. A study of public international law. Lawrence's *Principles of International Law.* Twice a week. (Given biennially. Not open in 1900–1901.)

53. **POLITICAL INSTITUTIONS OF THE UNITED STATES.** Lectures and recitations. A study of the origin, nature and workings of the political institutions of the United States, and an analysis of the form and powers of the government. Bryce's *American Commonwealth.* Three times a week.

55. **GOVERNMENT OF DEPENDENCIES.** A study of the political institutions of the leading colonial governments. Lectures, assigned readings and special reports. Twice a week.
(Given biennially. Not offered in 1900–1901.)

SECOND SEMESTER

52. **MUNICIPAL GOVERNMENT.** Lectures, collateral readings and special reports. A study of the development and status of modern municipalities, and a comparative study of recent American municipal charters. Twice a week. This Course forms a good sequent to Political Science 55, but is not dependent upon it.

54. **COMPARATIVE POLITICAL INSTITUTIONS OF EUROPE AND AMERICA.** Lectures, recitations, collateral readings and special reports. A comparative study of the political institutions and governmental forms and powers in the United States, England, Germany, France and Switzerland. Three times a week. Course 54 must be preceded by Course 53.

56. **HISTORY OF TREATIES AND MODERN DIPLOMACY.** A study of the leading treaties of modern times with special reference to their bearing upon international law. Accompanied by collateral reading and special reports. Twice a week. This course must be preceded by Course 51.

RHETORIC AND ENGLISH LANGUAGE

[University Hall, Rooms 38, 40, 42, 44, 55.]

Professor Denney, Assistant Professors Graves, McKnight, Allen, Mr. Parker

Courses 51, 52, and either 53 or 54 are fundamental; Courses 55, 56, and 60, are advanced courses in composition; Courses 57, 58, 75 and 76 are advanced courses in public speaking; Courses 69, 70, 71, 72, 73 and 74 are philological; Courses 67 and 68 are pedagogical. Courses 59, 61, 62, 73 and 74 are usually found suitable for graduate students as well as for advanced undergraduates. Further courses of study exclusively for graduate students are arranged at the beginning of each year to meet individual needs and purposes.

FIRST SEMESTER

51. **ENGLISH COMPOSITION.** Three times a week. Credit two and one-half hours.

(a) Scott and Denney's "Paragraph Writing." Themes. Twice a week.

(b) Oral Practice. Once a week with the instructor in public speaking.

53. **STUDIES IN EXPOSITION.** Four times a week.

(a) Rhetorical analysis of prose; with essay-writing. Three times a week.

(b) Oral composition. Once a week with the instructor in public speaking. Course 53 must be preceded by Course 52.

55. **RAPID WRITING.** Once a week. The preparation of articles for the press, with exercises in observation, reporting, abstracting, condensation, expansion, interviewing, proof-reading, correspondence, and a study of newspaper forms. A special course for students preparing for journalism. Open to those who have passed Course 53 or 54.

57. **BRIEF MAKING AND ARGUMENTATION.** Three times a week. Practice in making briefs of noted speeches and original briefs for debate; lectures on logical analysis, evidence and argumentation. Class debates once a week, criticised by the instructor in public speaking. Course 57 must be preceded by Course 53 or 54.

59. **POETICS.** Twice a week. Lectures, prescribed readings, and reports. Gummere's "Hand-book" and Aristotle's "Theory of Poetry" used for reference. Course 57 must be preceded by Course 53 or 54.

61. **RHETORICAL THEORY.** Two hours a week. Lectures on the principles of style, and theories of rhetoric as historically developed, accompanied by special investigations of rhetorical problems with reports and discussions. An introduction to methods of research and the use of material. Exclusively for advanced undergraduates and graduates, who are making their theses in one of the English Departments.

67. **TEACHERS' COURSE IN RHETORIC.** Two hours a week. Lectures, conferences and prescribed readings on the teachings of composition and rhetoric in the schools. A special course for teachers and those intending to teach. Open only to advanced undergradutes, and to teachers who hold auditors' tickets.

69. **HISTORY OF THE ENGLISH LANGUAGE.** Twice a week. Emerson's "Brief History," with lectures and reading.

71. **OLD ENGLISH PROSE.** Twice a week. Bright's "Anglo-Saxon Reader." Course 71 must be preceded by Courses 69 and 70.

73. **OLD AND MIDDLE ENGLISH PHILOLOGY.** Two hours a week. Course 73 must be preceded by Courses 71 and 72.

75. **EXTEMPORE SPEAKING.** Two hours a week. Speaking from briefs and topical outlines on subjects previously mastered. Course 75 must be preceded by Courses 57 and 58.

SECOND SEMESTER

52. **ENGLISH COMPOSITION.** Three times a week. Credit two and one-half hours.

(a) Cairns' "The Forms of Discourse." Themes. Twice a week.

(b) Oral Practice. Once a week with the instructor in public speaking. Course 52 must be preceded by Course 51.

54. **STUDIES IN EXPOSITION.** Four times a week. Repetition of Course 53. Course 54 must be preceded by Course 52.

56. **RAPID WRITING.** Once a week. Continuation of Course 55, and must be preceded by Course 55.

58. **BRIEF-MAKING AND ARGUMENTATION.** Three times a week. Continuation of Course 57 and must be preceded by Course 57.

60. **SHORT STORIES.** Twice a week. Lectures, prescribed readings, reports, and practice under criticism. A study of the plan, purpose, diction, and structure of selected narratives, with plot analysis. Course 60 must be preceded by Course 53 or 54.

62. **PROBLEMS IN CRITICISM.** Two hours a week. Special research work, reports and a thesis. Course 62 must be preceded by Course 61.

68. **TEACHERS' COURSE IN ENGLISH LANGUAGE AND GRAMMAR.** Two hours a week. A special course for those engaged in teaching and those intending to teach. Open only to advanced undergraduates, and to teachers who hold auditors' tickets.

70. **DEVELOPMENT OF ENGLISH PROSE.** Twice a week. A rapid survey of the history of English idiom, with lectures and readings. Course 70 must be preceded by Course 69.

72. **OLD ENGLISH PROSE AND POETRY.** Continuation of Course 71 and must be preceded by Course 71.

74. **OLD AND MIDDLE ENGLISH PHILOLOGY.** Continuation of Course 73 and must be preceded by Course 73.

76. **EXTEMPORE SPEAKING.** Continuation of Course 75 and must be preceded by Course 75.

COLLEGES OF AGRICULTURE AND DOMESTIC SCIENCE, ENGINEERING AND PHARMACY

6. **ADVANCED RHETORIC.** Twice a week.

A. Prescribed readings in the literature of technology and science; and the analysis of specimens of this literature. Once a week.

B. Reports, abstracts, memoranda, and notes of lectures and of articles in the technical journals; practice in drawing specifications and writing brief papers on technical and scientific subjects. Once a week.

Two hours a week. (First, Second and Third Terms, second year, Courses in Industrial Arts, Manual Training, and Electrical and Mechanical Engineering; third year, Courses in Architecture, Ceramics, Chemistry, and Civil and Mining Engineering.)

5. **ENGLISH COMPOSITION.**

A. Scott and Denney's Paragraph-Writing; Macaulay's Warren Hastings; Cairn's Forms of Discourse; Themes. Twice a week.

B. Oral practice with the instructor in public speaking. Once a week.

(First, Second and Third Terms, first year.) Three times a week. Credit two and one-half hours. All four-year courses.

4. **ADVANCED COMPOSITION.** Twice a week. Elective.

ROMANCE LANGUAGES AND LITERATURES

[University Hall, Rooms 35 and 34.]

Professor Bowen, Assistant Professor Bruce

The Department of Romance Languages and Literature offers courses of instruction and research in the three leading languages of the group whose origin is to be traced to the Latin or Roman idiom. These three languages are the French, Italian and Spanish. The foremost place in the work of the Department is naturally assigned to the French. In the study of this language the first desideratum is a thorough reading knowledge, which shall lead directly to the study of the literature. For all the languages taught in this department, it is assumed that the highest educational value lies in the acquiring of the ability to read them intelligently, to translate them correctly, to understand, appreciate and compare the various phases of their literatures, and to grasp the principles of their historic development. The practical side of the work, that which deals mainly with the acquiring of the ability to speak these languages with accuracy and ease, is regarded as supplementary, and as such receives due attention.

Exclusive of library facilities, the Department possesses, as aids in illustrating and supplementing the work, the following collections: Complete set of maps (including Paris); illustrated volumes showing various phases of the arts and sciences, costumes and manners, public instruction, dramatic representations, etc., in France at different epochs; large photographs and engravings of the principal French writers; collections of French prose extracts for use in sight reading.

I. FRENCH

FIRST SEMESTER

51. **ELEMENTARY FRENCH.** Four hours a week. Grammar: Edgren's (Part I), Grandgent's Essentials, or Joynes' Minimum, with written exercises. Reader: Super's (from Part II) or Whitney's (Parts I and II) or Kuhns' French Reading for Beginners. In this course the study of the language is taken up from the beginning. Stress is laid at first upon the acquisition of a correct pronunciation, after which the entire energy of the student is directed toward the attainment of a full and accurate reading knowledge of the language. Grammar and composition are made to contribute to this end.

53. **SCIENCE READING.** Two hours a week. A course introductory to the vocabulary of scientific literature, designed to familiarize the student with technical terms and style. Open to those who have completed Courses 51 and 52, or who have received credit for French as an entrance subject.

55. **MODERN FRENCH LITERATURE.** Four hours a week. Contes and Novels: Bercy's *Contes et nouvelles modernes*. Balzac, Eugénie Grandet. Prose Composition: Edgren's French Grammar [Syntax] or Chardenal's French Exercises for Advanced Pupils. Lectures supplement the work; private reading required; systematic attention given to syntax and idiom. Open to those who have completed Courses 51 and 52, or who have received credit for French as an entrance subject.

57. **FRENCH COMEDY.** Three hours a week. Study of the growth of French Comedy, with work centering upon Molière [four plays], Regnard [le Joueur] and Beaumarchais [le Barbier de Séville]. Lectures and collateral reading. Open to those who have completed Courses 55 and 56.

59. **ADVANCED PROSE COMPOSITION.** One hour a week. Practice in speaking and writing French. Intended for advanced students who desire special training on the practical side of the language. Open to those who have completed Courses 55 and 56.

61. **FRENCH TRAGEDY.** Three hours a week. Racine and Voltaire. Lectures and readings, with assigned topics, reports and discussions. Part of the lectures given in French. Practical work continued. An advanced Course intended for students who have completed Courses 57, 58, 59 and 60. Any others must have the special consent of the head of the Department.

63. **FRENCH LITERATURE BEFORE THE SEVENTEENTH CENTURY.** Three hours a week. Special study of la Chanson de Roland. General Survey of the Old French period. Critical study of Montaigne [De l'institution des enfans]. Lectures (partly in French) on the literature of the sixteenth century. Assigned topics and reports. An advanced Course with the same conditions as in Course 61.

(Given biennially. Not offered in 1900–1901.)

65. **LITERARY CRITICISM IN FRANCE.** Two hours a week. Readings and lectures. Selections from Sainte-Beuve, Lemaitre, Brunetière and others. Open to those who have completed Courses 55 and 56.

SECOND SEMESTER

52. **MODERN PROSE AND PLAYS.** Continuation of Course 51. Four hours a week. Historical and narrative prose; one or more prose comedies. Sight reading is emphasized.

54. **SCIENCE READING.** Continuation of Course 53. Two hours a week.

56. **MODERN FRENCH LITERATURE.** Continuation of Course 55. Four hours a week. Lyric Poetry: Bowen's Modern French Lyrics. Drama: Comparative study of the classical and the romantic drama: Corneille, Horace; Hugo, Hernani. Private reading: Hugo's la Chute.

58. **RECENT FRENCH PROSE.** Three hours a week. Rapid reading with lectures. Critical study of some of the leading prose writers of the present, such as Bourget [Selections ed. Van Daell], Coppée [On rend l' argent], Daudet [le Nabab], Zola [la Débacle]. Open to those who have completed Courses 55 and 56.

60. **ADVANCED PROSE COMPOSITION.** Continuation of Course 59. One hour a week.

62. **CHATEAUBRIAND AND THE PRECURSORS OF THE ROMANTIC MOVEMENT.** Three hours a week. Lectures and readings, with assigned topics, reports and discussions. Part of the work conducted in French. Practical drill continued. An advanced course intended for students who have completed Courses 57, 58, 59, 60 and 61 (or 63.) Any others must have the special consent of the head of the Department.

64. **THE DEVELOPMENT OF THE FRENCH NOVEL.** Three hours a week. An advanced course with the same plan of work and the same conditions as in Course 62.

(Given biennially. Not offered in 1900–1901.)

Courses 62 and 64 are supplemented, toward the close of the year, by several lectures on: Methods of teaching French and the teacher's equipment.

66. **FRENCH TRAVEL-WRITERS.** Two hours a week. Readings and lectures. Scenes of travel from Gautier., Hugo and Dumas. Open to those who have completed Courses 55 and 56.

II. ITALIAN

51. **GRAMMAR AND READINGS.** Two hours a week. First Semester. Grandgent's or Edgren's Italian Grammar and Bowen's First Italian Readings. Open to those who have completed Courses 51 and 52 (or an equivalent) in French.

52. **GOLDONI AND DANTE.** Continuation of Course 51. Two hours a week. Second Semester.

(Italian is given biennially. Above Courses not offered in 1899–1900.)

III. SPANISH

51. **GRAMMAR AND READINGS.** Two hours a week. First Semester. Edgren's Spanish Grammar and Matze's First Spanish Readings.

52. **MODERN PROSE AND DRAMA.** Continuation of Course 51. Two hours a week. Second Semester. Alarcón el Capitán Veneno (Ford); Galdós, Dona Perfecta; Cortina, el Indiano. Brief talks on Spanish literature and philology.

(Spanish is given biennially. Above Courses not offered in 1900–1901.)

SANSKRIT

(*See* Germanic Languages)

SHOPWORK

(*See* Industrial Arts)

SOCIOLOGY

(*See* Economics and Sociology)

VETERINARY MEDICINE

[Veterinary Hospital and Townshend Hall]

Professor White, Dr. Lavery, Dr. Frederick, Dr. Brumley

COLLEGES OF VETERINARY MEDICINE AND AGRICULTURE

11. **VETERINARY ANATOMY:** Osteology. Lectures illustrated with skeletons and anatomical preparations. Dissections. Five times a week First term.

12. **MYOLOGY, SPLANCHNOLOGY.** Practical dissections and demonstrations on cadavers. Five times a week. Second term.

13. **ANGIOLOGY AND NEUROLOGY.** Lectures illustrated by drawings, in the dissecting room, and on anatomical models. Five times a week. Third term. Books recommended for reference and study: Strangeway's Veterinary Anatomy (new edition); Chauvau's Comparative Anatomy; McFaydean.

14. **GENERAL PATHOLOGY AND MORBID ANATOMY.** Lectures four times a week. First term. Text-book: Green's Morbid Anatomy.

15. **THEORY AND PRACTICE OF VETERINARY MEDICINE.** Sporadic, non-infectious diseases. Four times a week. Second term.

16. **THEORY AND PRACTICE OF VETERINARY MEDICINE.** Four times a week. Third term.

17. **THEORY AND PRACTICE OF VETERINARY MEDICINE.** Four hours a week. First term.

18. **THEORY AND PRACTICE OF VETERINARY MEDICINE.** Infectious and contagious diseases. Four times a week. Second term. Text book: Friedberger and Froehner

19. **GENERAL THERAPUETICS.** Lectures. Five times a week. Third term.

20. **GENERAL SURGERY.** Lectures and demonstrations on the use of antiseptics in wound healing; suturing and bandaging; use of local and general anæsthesis, etc. Five hours a week. First term.

21. **SURGIC L DISEASES** Lectures; illustrated by practical demonstrations, by drawings, on clinical cases. Head and neck. Five hours a week. Second term.

12. **SURGICAL DISEASES.** Continuation of 21. Trunk and limbs. Five hours a week. Third term.

23. **SURGICAL DISEASES.** Continuation of 22. Five hours a week. First term.

24. **OPERATIVE SURGERY.** Practical operations on narcotized subjects Three hours a week. Second term. Text books: Moeller; Liautard; Fleming.

25. **PRINCIPLES OF HORSESHOEING.** Lectures and demonstrations. Includes diseases of the foot and pathological shoeing. Four hours a week. First term. Text book: Dollar.

26. **MEAT INSPECTION.** Lectures and recitations. Text book: Peter's Meat Inspection.

27. **CANINE DISEASES.** Lectures and recitations. Three times a week. First term.

28. **CANINE DISEASES.** Continuation of 27. Three times a week. Second term. Text book: Mueller Glass.

29. **VETERINARY OBSTETRICS.** Lectures, recitations, and clinical practice. Three hours a week. Second term. Text books: Fleming; Dalrymple.

30. **OPHTHALMOLOGY.** Diseases of the Eye. Two hours a week. Third term.

31. **CLINIC IN THE VETERINARY HOSPITAL:** Stationary and Ambulatory. Daily at 10 to 12 m. Students of the second and third years are required to take part in the clinics. First, second and third terms.

32. **DISEASES OF THE COW:** Special Course for dairy students. Three times a week. Second term.

33. **VETERINARY MEDICINE FOR AGRICULTURAL STUDENTS.** Veterinary anatomy. Five times a week. First term.

34. **VETERINARY MEDICINE FOR AGRICULTURAL STUDENTS.** Contagious and non-infectious diseases. Five hours a week (one hour devoted to practical, clinical work). Second term.

35. **VETERINARY MEDICINE FOR AGRICULTURAL STUDENTS.** Contagious and non-infectious diseases. Five hours a week (one hour devoted to practical, clinical work). Second term.

ZOOLOGY AND ENTOMOLOGY

[Biological Hall, Rooms 3, 4, 7, 8, 9 and Third Floor]

Professor Osborn, Assistant Professor Hine, Mr. Landacre

COLLEGE OF AGRICULTURE

1. **INVERTEBRATE AND VERTEBRATE.** Three times a week. Invertebrate, first and second term; Vertebrate, third term. This course includes a general discussion of groups, dissection of types and an outline of classification. Especial attention is given to forms of economic importance either from their detrimental effects on crops, stock, etc., or from their utility in various industries or as domesticated species.

3. **ECONOMIC ENTOMOLOGY.** Insects of Forest, Orchard and Garden. Three times a week. Third term. A detailed study of injurious species intended particularly for students of Horticulture. The work includes field studies, collections, reports on observation, etc.

4. **ECONOMIC ENTOMOLOGY.** Twice a week, through the year. This Course must be preceded by Course 1. A systematic study of the group of insects with special reference to injurious and beneficial species. A foundation is laid for special study in Entomology. Preparation of collections, essays, life history studies and use of remedial measures along with laboratory studies on general anatomy and class recitations and lectures.

7. **SYSTEMATIC AND PRACTICAL ENTOMOLOGY.** Two lectures and one laboratory period a week. Third term. An elementary practical Course for students in the Short Course in Agriculture.

8. **PARASITES OF DOMESTIC ANIMALS.** A lecture course devoted to the principal parasitic animals affecting domestic animals intended especially to meet the needs of those who intend to give particular attention to stock raising. Once a week. First term.

9. **SPECIAL ENTOMOLOGY.** Studies of life-histories, collection and classification in selected groups. Field work and lectures. Four periods each week. Elective. Fall term.

10. **SPECIAL ENTOMOLOGY.** Studies of winter condition of Insects, Insecticides, Insecticide machinery, Methods of preparing insect illustrations, Greenhouse pests, etc. Four periods each week. Elective. Winter term.

11. **SPECIAL ENTOMOLOGY.** Investigations of selected groups or species. Lectures on Insects legislation, distribution, natural enemies, special methods of control, etc. Four periods each week. Elective. Spring term.

Courses 9, 10 and 11 are intended as practical courses in entomological research adapted especially for those who wish to give special attention to this branch with reference to future work in Agriculture or Horticulture and to furnish a preparation for those who have in view work as entomological investigators in experiment stations or as teachers in agricultural schools. They may be taken as graduate courses if not elected earlier or continued as special lines of research during a graduate course embracing other special subjects.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

Courses 57, 58, 59, 60, 61, 62 must be preceded by 51 and 52, 53 and 54, 64 or Zool. 1, of College of Agriculture.

FIRST SEMESTER

41. **COMPARATIVE ZOOLOGY.** Two lectures and one laboratory period a week. This course includes studies of types of different groups, discussions of principles and an outline of classification. Thomson's "Outlines" used as a basis.

53. **COMPARATIVE ANATOMY OF VERTEBRATES.** A laboratory course. Two laboratory periods and one quiz each week; devoted to Osteology, Myology, Splanchnology, Neurology and a full study of certain type forms. Weidersheim's "Comparative Anatomy of Vertebrates" is followed as a basis.

55. **COMPARATIVE ANATOMY OF VERTEBRATES.** A laboratory course. Four laboratory periods and one quiz each week. Similar to 53, but more extended.

57. **ZOOLOGY AND ANATOMY.** Advanced laboratory. Three laboratory periods a week.

On entering this course one may choose his work from any of the following lines:

(*a*). **ANATOMY OF THE FROG.** The guides used are Ecker's "Anatomy of the Frog," and Huxley and Martin's "Practical Biology." Both the gross anatomy and the histology will be studied, the student himself preparing the tissues, as directed; as time may permit, comparisons will be made with other Amphibia.

(*b*). **COMPARATIVE ANATOMY OF INVERTEBRATES.** The manuals used are: Shipley's "Invertebrate Zoology," Lang's "Text-book of Comparative Anatomy," McMurrich's Invertebrate Morphology" and Parker and Haswell's "Text-book of Zoology."

(*c*). **INVERTEBRATE EMBRYOLOGY.** Text-book, Translation of Korschelt and Heider's "Embryology of Invertebrates."

(*d*). **VERTEBRATE EMBRYOLOGY.** The embryology of the chick or frog will be thoroughly studied as a basis; this will be followed by a study of the embryology of the fish, amphibian, and mammal. The course aims to give thorough drill in embryological and histological technique. The books used are Foster and Balfour's "Elements of Embryology," and the works of Hertwig, Minot, Balfour and Marshall.

(*e*). **COMPARATIVE NEUROLOGY.** This is a course in the anatomy and histology of the central nervous system, and will include a study of the brain and spinal cord of all classes of vertebrates. Edinger's "Lectures on the Central Nervous System" will be followed, and numerous treatises and special papers used as a reference.

(*f*). **CELLULAR BIOLOGY.** Text-books, Hertwig's "The Cell and the Tissues;" and Wilson's "The Cell in Development and Inheritance."

A student whose major lies in Zoology may take two full years' work selected from subjects named in the foregoing paragraph.

Zoological Seminar. The class will meet weekly to discuss methods and present reviews of current literature. Each student will be expected to present at least one major and one minor review each term.

59. **ZOOLOGY AND ANATOMY.** Advanced laboratory. Five times a week. Similar to 57, but more extended.

61. **ENTOMOLOGY.** An advanced Practical Course. Five periods a week. The courses are designed for those who wish to make a thorough study of some particular group of insects or to follow some definite line of the science, either morphological or systematic, or to fit themselves for professional entomological work. The work will be arranged with each student.

The collections, monographs, and apparatus at the command of the Department afford excellent opportunities for advanced work in Entomology.

Students are required to take part in the Zoological Seminar of the preceding paragraph.

65. **ORNITHOLOGY.** Two laboratory periods a week. Advanced work on Morphology, Ecology and Classification of Birds.

SECOND SEMESTER

52. Continuation of Course 51. Lectures twice a week. One laboratory period.
54. Continuation of Course 53. Three laboratory periods a week.
56. Continuation of Course 55. Five laboratory periods a week.
58. Continuation of Course 57. Three laboratory periods a week.
60. Continuation of Course 59. Five laboratory periods a week.
62. Continuation of Course 61. Five laboratory periods a week.
66. Continuation of Course 65. Two periods a week.

ENROLLMENT

1899-1900

COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE

GRADUATE STUDENTS—4

Derby, Florence, B. Ph.....Columbus
Gilmore, William Henry, B. Sc. (Agr.).....Millersport
Nichol, Gertrude, B. Ph.....Columbus
Sheldon, Helen Griswold, A. B. (Vassar College).....Shepard

UNDERGRADUATES — 153.

	Course	Course Hours	Credit Hours	Home Address
*Abbott, George Franklin.....	Agr.	210½	56	Medina
Abbott, Carl B.....	Agr.	206	112	Medina
Adcock, James G.....	Agr. S.	98	...	Webb Summit
Armstrong, Edgar Manley.....	Dairying	...	...	Zanesville
Armstrong, Clara	Dom. Sci.	203	150	Columbus
*Arnold, Frank Washington.....	Agr.	210½	43½	Somerset
*Atherton, William Thomas	Agr.	210½	71	Carrollton
Baldwin, Ethel Florence.....	Dom. Sci.	202½	47	Columbus
Bauman, Christian William.....	Dairying.	...	...	Axtel
*Beale, Harry Glenn.....	Agr.	206	99	Mt. Sterling
*Beatty, Madge	Dom. Sci.	202½	41½	Columbus
Beneker, Robert Edgar.....	Agr.	210½	54½	Cincinnati
Boggs, Howard Shannon.....	Agr. S.	98	60½	Kingston
Bratton, Alice May.....	Dom. Sci.	203	144	Columbus
Breckenridge, William Kemper.....	Agr. S.	98	98+5	Watertown
Breese, Clarence Nye.....	Agr. S.	98	97+6	Lima
Bugby, Morris O.....	Agr.	210½	51½	Kingsville
*Bundy, Lyman Edmund.....	Special	...	47	Colerain
Byers, William Gerald.....	Agr. S.	98	48	Lilly Chapel
Cahill, Verrill W.....	Agr. S.	98	44	Tiro
Candy, Ella Belle.....	Special	...	24	Columbus
Carey, Nathan Harold.....	Dairying	...	...	Gurneyville
*Church, James Scott.....	Agr.	206	55½	Palmyra
Clark, Herman Alfred.....	H. & F.	206	96	Medina
Clark, Ollie Dwight.....	Agr. S.	98	48	Wheaton
Clawson, Lucy Blanche.....	Dom.Sci.S.	90	90+11½	Okeana
Coberly, Edward D.....	Agr. S.	98	50+2	Georgesville
Conradi, Albert Frederick.....	Agr.	206	98	New Bremen
*Cotton, Edwin Charles.....	H. & F.	206	115½	Elyria
Cotton, George Washington.....	Dairying	...	...	Elyria
Crabb, James Byel	Agr. S.	98	98+11	Mt. Sterling
Crawford, Mary B.....	Dom. Sci.	203	195+10	Blaine
Creamer, Jesse Carlton.....	Agr. S.	98	54	Jeffersonville
Dallas, John Thomas, B. Sc.....	(Agr.)	...	...	Pine Valley
Davis, Carrie Samantha.....	Special	...	...	Rio Grande
*Davis, Ella Augusta.....	Dom. Sci.	202½	52½	Constantia

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Davis, Vernon Hayes, B. Sc.	(Agr.)	...	...	Byesville
Day, Albert Edward	Agr. S.	98	89+29	Mt. Carmel
*Demorest, Herbert Russell	Agr.	206	91	Columbus
Dixon, Eva Nicholson	Dom. Sci.	203	122	Columbus
Dock, Norton	Agr. S.	98	59+2	Cincinnati
*Dresbach, Mary	Dom. Sci.	203	132	Columbus
Dunlap, Frederick	Special	...	19	Chillicothe
Dunn, Hattie Franklin	Special	...	29	Columbus
Everett, William Russell	Dairying	...	...	Gnadenhutten
Ewart, John Weston	Dairying	...	...	Mogadore
*Ferguson, Ollie	Agr.	210½	33½	Steubenville
*Finlay, Annetta Jane	Dom. Sci.	203	104	Keene
Fippin, Elmer Otterbein, B. Sc.	(Agr.)	...	...	Galloway
Fisher, Milo Eddison	Agr. S.	98	44	Chili
Flory, Charles Henry	H. & F.	206	73	Arcanum
*Foster, Emma Warwick	Dom.Sci.S.	90	68½	Higbys
Foster, John Cook, Jr.	Agr. S.	98	61+1½	Higbys
Foster, Michael Leander	Dairying	...	...	Axtel
Frank, John Nicholas	Agr. S.	98	32+4	North Amherst
*Galehouse, David William	Agr.	206	142	Doylestown
*Gibson, Herbert R.	Agr. S.	98	34+48	Camp Chase
*Gladding, Maynard Marcus	Agr.	206	93	Windsor
Graber, Christian	Dairying	...	...	Burton
*Hamilton, Frank Edward	Agr.	206	93	Brownsville
Hanna, Charles Mitchell	Agr. S.	98	47	Tiro
*Hard, Jesse M.	Agr.	210½	21	Olentangy
Harper, Merritt	Agr.	206	150	Grove City
Hatfield, Clifford Christian	Agr. S.	98	52	Lebanon
Hayden, Cassius Clay, B. Sc.	(Agr.)	...	...	Oakdale
Heller, John	Dairying	...	...	Ona, W. Va.
Henderson, Harry Harold	Agr. S.	98	16	West Cairo
*Hess, Flora Louise	Dom. Sci.	203	65	North Columbus
*Hill, Mamie Faye	Dom. Sci.	203	116	Columbus
*Holloway, Carrie	Dom. Sci.	203	50	Columbus
Holt, David C.	Dairying	...	...	Galloway
Hoover, Clarence Boal	Agr.	210½	46½	Venice
*Hoover, Edna Brown	Dom. Sci.	202½	24	Columbus
Hunt, Jay Horatio	Dairying	...	...	Columbus
Hyatt, James Vernon	Agr. S.	98	44	Augusta
Immell, Woodford Elias	Agr. S.	98	29+3	Chillicothe
Innis, Byron Schofield	Agr. S.	98	51	Wagram
*Irwin, Arthur Milton	Agr.	210½	37½	Parkman
*James, Harold Francis	H. & F.	210½	32½	Pekin, China
Jennings, Otto Emery	Agr.	206	93	Olena
Jones, Lloyd	Agr. S.	98	98+7½	Columbus
Karrer, Carl	Agr. S.	98	5	Dublin
Kaylor, Rollie Washington	Dairying	...	...	Bellefontaine
*Kelley, William Lester	Agr.	206	85	Newark
Kinney, Charles C.	Dairying	...	...	Yellow Springs
Klein, Edith May	Special	...	11	Columbus
Kynett, Albert Gardner	Dairying	...	...	Collier, W. Va.

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Ladrach, John J.	Dairying	...	...	Birmingham
Langdon, Elmer	Agr. S.	98	63+3	Sabina
Lanman, Faith Robinson	Dom. Sci.	202½	52½	Columbus
Lindley, Lulu	Dom. Sci.	202½	38	Fredericktown
*Linsley, Frank Preston	Agr.	210½	15½	Gallipolis
*Long, Frank C.	Agr.	206	73	West Sonora
Mallow, Harry Campbell	Agr. S.	98	40	Washington C. H.
Marshall, Ida	Dom. Sci.	203	89	Hemlock
Mason, Arthur Devillo	Agr.	206	119	Wellington
Mears, William Holt	Agr. S.	98	48+3	Moscow
Meek, Eunice	Dom.Sci.S.	90	45	Afton
Meiche, Louis	Agr. S.	98	98+7	North Royalton
Mesloh, Harry Smith	Agr. S.	98	55	New Bremen
Miller, Merritt Finley, B. Sc.	(Agr.)	...	...	Ridpath
Miller, Maynard Everett, B. Sc.	Dairying	...	...	Dodgeville
Miner, Charles Austin	Agr. S.	98	98+16	Bristolville
Mooney, Charles Napoleon, B. Sc.	(Agr.)	...	...	Milan
Murray, Edna Earl	Dom. Sci.	203	132	Columbus
*McAlister, Lee Paden	Agr.	210½	31	Thornville
McCall, Arthur Gillet, B. Sc.	(Agr.)	...	...	McGraw
McClelland, Chester Arthur	Agr.	210½	48	Terrace Park
McKinley, Ira Esdras	Agr. S.	98	20	Vaughnsville
McMahon, Mary Gertrude	Dom.Sci.S.	90	80½	Columbus
*McOwen, James Jr.	H. & F.	206	157	Ovid
*Neill, Nelson Prentice	Agr.	206	150	Venice
Nelson, Fred Burgess	Agr. S.	98	79	Coe Ridge
Nelson, Fred Walker	Agr. S.	98	52	Salem Center
Nelson, Homer Thrall	Agr. S.	98	...	Selma
Oliver, Charley Ray	Dairying	...	...	Portersville, Pa.
Orton, Louise Taft	Special	...	4	Columbus
Osborn, Alice	Dom.Sci.S.	90	90+43	Cadiz
*Osborn, Harry Lester	Agr.	210½	48	Chardon
Oswald, Rudolph	Dairying	...	...	Aurora
Perry, Elma Brooks	Dom. Sci.	203	176	Troy
Perry, John Cole	Agr.	206	165	Columbia Station
Peters, Frances Bush	Dom.Sci.S.	94½	44½	Columbus
Poindexter, Charles Cardoga	Agr.	210½	51½	Park'sb'g, W.Va.
Postle, Stuart A.	Dairying	...	...	Camp Chase
Richards, Don Arthur	Dairying	...	...	Medina
*Riley, Valeria	Dom. Sci.	203	131	Washington C.H.
*Ruhlen, La Mott	Agr.	206	104½	Plain City
*Schaeffer, Freelan Wilbert	Agr.	206	188	Spanker
*Scott, Edith Clare	Dom. Sci.	202½	26	Mt. Pleasant
Senter, Pearl	Special	...	45	Shepard
Shaffer, Jesse	Dairying	...	...	Black Lick
Shaw, Edward Lee	Agr.	206	108	Newark
Shepard, Allen Day	Dairying	...	...	Conneaut
*Sigrist, John Larkum	Agr.	206	107½	Congress
*Skiles, Blanche Gertrude	Dom. Sci.	203	115	Shelby
*Smith, Wilford B.	Agr.	210½	36	Chesterhill
Snyder, Addison Hogan	Agr.	206	158	Tacoma

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Stahl, Price Ewing	Agr. S.	98	47+2½	Jewett
Steward, Charles Benjamin, B. Sc.	(Agr.)	...	...	Marcy
Stiers, Thomas Vernon	Agr. S.	98	26	Zaleski
Sumner, Mrs. R. M.	Special	...	12	Columbus
Taylor, Frederick Wellington, B. Sc.	(Agr.)	...	...	Wooster
Thomas, Elmer Ellsworth	Dairying	...	...	Newark
Thompson, Jesse Eugene	Agr. S.	98	53	Bristolville
Trowbridge, Warner Wesley	Agr. S.	98	98+6	Painesville
Tyler, Fred J., B. Sc.	(H. & F.)	...	...	Perry
*Walker, William	Agr.	210½	36	West Canaan
Wampler, Milton Eugene	Agr. S.	98	55+3	Dayton
Weisman, Laura Anna, B. Sc.	(Dom.Sci.)	...	...	Columbus
Wheeler, Leroy Thomas	Agr. S.	98	58+6	Chillicothe
Williamson, Frances Glade	Dom.Sci.S.	94½	36	Columbus
Wolfe, La Verne Florence	Dom.Sci.S.	94½	45	Lucas

* Preparatory work incomplete.

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

GRADUATE STUDENTS—25

Allen, Lucy, B. A., 1897.....Columbus
Barrows, Sarah Tracy, M. L.....Columbus
Blakiston, Mary, B. Ph., 1893.....Columbus
Bohn, William Edward, B. A. (German Wallace College).....Olmsted Falls
Brown, Harold Warner, B. Sc. (Cornell University).....Oberlin
Collett, Samuel William, M. Sc. (Moore's Hill College).....Columbus
Converse, Edward Jasper, B. A., 1886, B. D. (Yale University).....Columbus
Doney, Carl Gregg, B. Sc., 1891, LL. B., M. A.....Delaware
Good, Paul Revere, B. A., 1899.....Westerville
Gore, Herbert Charles, B. Sc. (University of Michigan).....Chicago, Ill.
Hannum, William H., B. A., 1887.....Columbus
Hirst, Anna Brewster, B. A. (Antioch College).....Yellow Springs
Huddleson, Don Carlos, G. Ph., 1897.....Columbus
Jeffrey, Maude Dorothy, B. Ph., 1895.....Columbus
Kirby, Harriet Rebecca, B. A., 1898.....Columbus
Maag, Benjamin (Wooster University).....Mt. Eaton
Machwart, Washington J., B. S. (Muskingum College).....Mt. Eaton
Mann, Wilbur Edwin, B. Ph., 1899.....Columbus
Milligan, Mrs. Clara F., B. A., 1886.....Columbus
Parker, John Bernard, B. A., 1898.....Danville
Raymond, Maude, B. Ph., 1899.....Columbus
Robinson, Zella Vina, B. Ph., 1898.....Columbus
Rogers, Ellen Chapin, Ph. B. (University of Michigan).....Grand Rapids
Williams, Herber Oswald, B. A., 1894.....Columbus
Young, John Wesley, B. Ph., 1899.....Columbus

UNDERGRADUATES—419

	Course	Course Hours	Credit Hours	Home Address
Abbott, Roy A., B. Ph.	.....	...	...	Columbus
*Adams, Elizabeth Jane	Arts	126	68	Columbus
*Adams, Margaret E.	Arts	126	58	Columbus
*Adamson, James Manley	L. & J.	99	15	Dayton
*Aldrich, Wesley Richard	L. & J.	99	17	Columbus
*Althauser, Louis Girod	Arts	127	...	Kenton
*Alward, Benjamin Clyde	E. Ph.	129	12	Pataskala
Andress, Edna Alice, B. Ph.	.....	...	...	Birmingham
*Andrews, John Davis	Arts	127	9	Hamilton
Armstrong, Dan Hinkle	Special	...	33	Jackson
Ash, Ray Charles	Prep. Med.	100	54	Ashland
Baldwin, Mabel Dennison	Special	...	13½	Columbus
*Ball, Danforth Ewers	Science	135	111	Columbus
*Ball, Ernestine Faye	Arts	127	32	Columbus
*Ballard, Marion Imrie	L. & J.	99	...	Canton
Barcus, Eliza, B. A.	.....	...	...	Columbus
*Barnet, Clarence Elwood	Special	...	80	New Paris
*Bartram, Faith Alberta	L. & J.	99	22	Columbus
Bauman, Samuel	Special	...	31	Birmingham
Beck, Edwin Long	L. Ph.	126	92	Lithopolis
*Beebe, Carl Vorhees	L. & J.	99	3	Mt. Gilead
*Beer, James Anderson	Prep. Med.	100	61+20	Ashland
Beery, Harry Reber	Arts	127	24	Canal Winchester
Bell, Florence Louise, B. Ph.	.....	...	...	Columbus
Bell, Mary Edith	Special	...	11	Columbus
*Bellows, Gertrude Halm	E. Ph.	128	65	Columbus
*Bigelow, Bernard Barton	L. Ph.	127	30	Findlay
*Bigelow, Hosea Bradley	Arts	127	24	Columbus
Bittner, William Pitt	L. & J.	98	68+2	Sandusky
Bohn, Frank, B. Ph.	.....	...	...	Olmsted Falls
Bonnet, Alvin Cook	Arts	127	33	Columbus
Booth, Carl Howard	L. Ph.	127	25	Columbus
*Booth, Cora Vrooman	L. Ph.	126	52	Columbus
*Booth, George Hamilton	L. Ph.	127	4	Columbus
Bostwick, Homer Z., B. A.	.....	...	...	Columbus
Bostwick, Valeria	Arts	126	64	Columbus
*Bower, Alice Ethel	E. Ph.	129	...	Worthington
*Bowles, John Porter	L. & J.	98	65	Columbus
Bradford, Frances Elizabeth	E. Ph.	129	29	Columbus
*Braun, Bertha Elizabeth	M. L. Ph.	127	...	Columbus
*Bridge, Effie Irene	Arts	127	33	Columbus
Brooks, Stanley Grange	Science	133	70	Columbus
Brown, Alexander Lackey	Special	...	...	Catlettsburg, Ky.
Brown, Jessie L. P.	Arts	126	60	Columbus
Brown, Winfred	Special	...	...	Moscow
*Bryant, William Cheney	L. Ph.	126	65	King's Creek
*Buck, Ralph William	Science	132	29	Cardington
*Bulen, Elwood Joseph	Com. & Ad.	131	5½	Columbus
Burgess, James Henry, B. Ph.	.....	...	...	Big Horn, Wy.

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Burgess, Norman Almon	Prep. Med.	100	16½	Parkman
*Burkey, Charles Paul	Special	...	41+11	Pleasantville
*Burr, Mary	E. Ph.	129	29	Worthington
Butler, Blanche Woodruff	Arts	126	102	Wellsville
*Cannon, Anna Cathrine	L. & J.	98	86+11	Columbus
Carpenter, Jessie Marie	E. Ph.	128	66	Columbus
Carson, Nellie Eliza	L. Ph.	126	86	Harrisburg
Chamberlain, Robert M	Science	133	92	Columbus
*Chaney, James William	E. Ph.	128	77	Columbus
*Clagett, Arthur E	Science	135	66	Dayton
*Clapp, Katharine B	Special	...	64	Norwalk
*Clevenger, Charles Henry	Science	131	55+19	Fletcher
*Clevenger, Joseph Franklin	Science	131	57	Fletcher
*Coad, James Earl	L. Ph.	127	12	St. Lewisville
*Coates, Elmer William	Arts	127	25	Pomeroy
Cockerill, Orville Porter	Special	...	75	Washington C. H.
*Coe, Bertha L	Special	...	12	North Columbus
Cole, Fred	M. L. Ph.	127	18½	Zanesville
Colgan, Lillian Katharine	Special	...	71	Columbus
Collins, Walter Scott	Arts	126	95	Columbus
*Compton, Edward Cass	L. & J.	99	27+12	Coshocton
*Connolley, Augusta	L. Ph.	126	72	Columbus
Connor, Alice Marie, B. Ph	.....	...	...	Columbus
Connor, Ellen Josephine, B. Ph	.....	...	...	Columbus
*Connors, John Leo	L. & J.	99	14	Columbus
Cooke, Levi	Arts	127	20	Columbus
*Corkery, Thomas Jefferson	Arts	127	25	Toledo
Corner, Edith	L. Ph.	127	87	Columbus
Cottom, Frank W	Prep. Med.	100	59+6	Dayton
Courtright, Elizabeth Pauline	Arts	128	107	Columbus
Courtright, J. Loring, B. A	.....	...	...	Circleville
Courtright, Stella Van	L. Ph.	126	96	Columbus
Coy, William Stacey	Arts	127	30	Columbus
Craig, Francis Miron	Special	...	25	Clarion
*Cunningham, Charles Gilman	E. Ph.	128	103	Fostoria
*Davidson, Harold Glenn	L. & J.	99	20	Dayton
*Davidson, Ruth Emily	E. Ph.	129	23½	Chicago, Ill.
*Davis, William Edgar	Arts	128	64	Columbus
Dean, Wilbur Spencer	Special	...	97	Warsaw
*Dean, Ethel Sourbray	L. & J.	99	41	Columbus
*DeNune, Ethel	Arts	126	58	Columbus
Derby, Alice G	L. Ph.	126	101	Columbus
Dickinson, George Codwice	Arts	126	89	Columbus
*Diehl, William Ross	E. Ph.	129	...	Columbus
Dill, Augusta Dille, B. Ph	.....	...	...	Columbus
Dollison, Harvey Clinton, B. Sc	.....	...	...	Zanesville
*Dolson, Benjamin Reimmund	L. & J.	99	25	Lancaster
Donovan, Dennis Aloysius	E. Ph.	128	78	Columbus
Dow, Mary Edna	Special	...	...	Bellefontaine
Dowd, Charles Fuller, B. Ph	.....	...	...	Toledo
Dubois, Wilbur L., B. Sc	.....	...	...	Cincinnati

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Dufour, Alice	Special	...	93	Columbus
Durbin, Samuel Clyde	E. Ph.	128	100	McConnelsville
Dyer, Clarkson Werter	Arts	127	25	Plano
Eagleson, John Hervey, B. A.	.....	...	...	Columbus
Eagleson, Joseph Pentecost, B. A.	.....	...	...	Columbus
*Eastman, Katharine	L. Ph.	127	27	Columbus
Easton, Ernest Doane	B. Sc.	129	77	Springboro
*Ebright, Bessie	E. Ph.	129	17	Columbus
Edwards, Norma	Special	...	27	Columbus
Eisenbise, Bertha, B. Ph.	.....	...	...	Columbus
Enderlin, Louis Charles	Special	...	...	Allegheny, Pa.
Ewalt, Clara Converse	E. Ph.	130	100	Columbus
*Farrar, Morton	L. Ph.	127	...	London
*Ferenbaugh, Burchard Blaine	Arts	127	33	Buckeye City
*Fink, Henry Emil	L. & J.	99	30	New Bremen
Fisher, Ida May, B. Ph.	.....	...	...	Columbus
Follett, Mary Pelton	L. Ph.	127	33	Columbus
Foster, Asa Emmanuel	Arts	126	58	New Salem
Fox, Ross Garfield, B. Ph.	.....	...	...	Columbus
Frederick, Albert Augustus	Special	...	...	Millersburg
French, Louis Vincent	E. Ph.	129	22	Jefferson
*Fullerton, Rutherford	L. & J.	99	33+3	Columbus
*Game, Francis Harvey	E. Ph.	128	60	Canal Winchester
Gamper, Hattie, B. Ph.	.....	...	...	Columbus
Gardner, Blanche	Arts	127	...	Columbus
Garman, Susan Editha	E. Ph.	131	41	Dayton
Gauch, James Arlando	Arts	126	64	West Manchester
Gayman, Charles Welton, B. Ph.	.....	...	...	Canal Winchester
Ginder, Floyd Edwin	Prep. Med.	100	25	Lancaster
*Godman, Leroy Hayes	L. & J.	98	57	Columbus
*Gordon, Earl Augustus	Prep. Med.	100	34	Junction City
*Gordon, Sarah Bryarly	Special	...	86	St. Mary's
*Gorham, Ira Garfield	Arts	126	44	Perrysville
*Graham, Reuben Jacob	E. Ph.	128	77	Northup
Greener, Gussie Howe	L. Ph.	126	102	Columbus
Griggs, Robert Fiske	Science	130	41	Columbus
Guittard, Claude B.	M. L. Ph.	126	41	New Bedford
Haecker, Christofer Frederick	Special	...	31	Sandusky
Hagenbach, George Edwin	L. Ph.	127	25	Urbana
Hahn, George Philip	Com. & Ad.	131	33	Napoleon
Hambleton, Ethel Ada	L. Ph.	126	91	Columbus
*Hambleton, Charles Reverdy	E. Ph.	129	2½	Hooksburg
*Hammond, Harvey George	L. & J.	99	...	Millwood
*Harbine, Sarah Smith	E. Ph.	129	41	Xenia
*Hard, Ansel Shallcross	L. & J.	99	22½	Bowling Green
Hardy, Caroline Church	Special	...	48	Columbus
Harward, Arthur Byron, B. A.	.....	...	...	Columbus
Hatcher, Wesley	Special	...	...	Raymond
*Hauk, Will Comrie	Arts	126	101	South Charleston
Heitman, William L.	Science	132	29	New Bremen
Henderson, Herbert B.	Special	...	91	Laceyville

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Hensel, Donald Dean	Com. & Ad.	131	69	Eaton
Herrick, Sara Ethel	E. Ph.	128	83	Wellington
*Herrman, Bessie	E. Ph.	128	69	Worthington
Hertlein, Alice Kelley	Special	...	6½	Sandusky
*Hicks, Blanche	L. Ph.	129	27	Centerburg
Hicks, Nellie	Arts	128	99	Centerburg
*Hickey, Thomas Owen	Prep. Med.	100	...	Caylick
Hirsch, Rudolph	Science	133	91	Columbus
Hite, Bertha	Special	...	14	Columbus
Hoffmann, Hattie DeLong, B. Ph.	.....	...	...	Columbus
*Holcomb, Harry John	Arts	128	90	Columbus
*Hommon, Harry Britton	E. Ph.	129	17	Marble Cliff
Honline, Mose A.	Special	...	50	Columbus
Hopkins, Bertha Marie	L. Ph.	126	64	Columbus
Hopkins, Clara M.	L. Ph.	126	61	Columbus
Hopkins, Edith Estelle	L. Ph.	126	65	Columbus
Houghton, Henry Spencer	Special	...	99	Columbus
Howard, Anna Faye, B. Ph.	.....	...	...	Columbus
*Hubbard, Desha Darling	L. Ph.	127	19	Columbus
Huddleson, Mabel Lee	Special	...	9	Columbus
Hudson, Clara Putnam	E. Ph.	128	58	Middleport
Huling, Frank	Arts	127	26½	Columbus
Humphrey, Stella Hale	Special	...	40½	Peninsula
Hungelmann, Arthur	Science	129	74	Columbus
*Hunt, Mary Fulton	L. Ph.	126	90	Columbus
Hunter, Anna Eliza	M. L. Ph.	126	66	Columbus
*Hunter, Joseph Symmes	Arts	126	87	Seven Mile
Hurst, Louise Kate	Special	...	17	Piketon
*Huston, Frank Arilda	M. L. Ph.	126	87	Columbus
*Jacoby, Benjamin	Science	130	33	Marion
*Jacoby, Ethelwyn	Arts	127	22	Columbus
Jacoby, Mrs. S. C.	Special	...	17	Columbus
Jaynes, Allan Brown, B. Ph.	.....	...	...	Columbus
Jeffrey, James Fred, B. Sc.	.....	...	...	Columbus
Jefferey, John Ralston	Special	...	80	Huron
*Jennings, Elma	M. L. Ph.	126	65	Eaton
*Jones, Daniel C.	E. Ph.	128	60	Jackson
*Jones, Gilbert Haren	Arts	127	27½	Columbus
*Jones, John William	E. Ph.	128	87	Jackson
Jones, Richard Thomas, B. Ph.	.....	...	...	Columbus
Jones, Victor Waite	E. Ph.	128	88	Columbus
*Jordon, Homer Garfield	Arts	127	22½	Columbus
*Justice, Charles Lloyd	Arts	126	22	Leipsic
Karshner, George Melville, B. A.	.....	...	...	Columbus
Kauffman, Margaret Glenn	M. L. Ph.	126	78	Columbus
Kauffman, Henrietta Christine	M. L. Ph.	126	92	Columbus
Keiser, Forest Le Grand	Science	130	22	Bryan
Kennedy, Herbert Welles	E. Ph.	128	...	Coe Ridge
Kerr, May Lizzie	E. Ph.	129	25	Rushville, Ill.
*Kimball, Mabel Fawn	E. Ph.	129	19½	Woodstock
Kinder, Gordon Donald, B. Ph.	.....	...	...	Ottawa

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
King, Bernice	Arts	126	48	Columbus
Kirk, George Barlow	Arts	126	82	Columbus
Klein, David, B. Ph	.....	...	...	Columbus
Knight, Caroline Estell, B. Ph	.....	...	...	Columbus
Knight, Margaret Amanda	Special	...	28	Columbus
Kohl, Clayton Charles	L. Ph.	126	90	Perryburg
*Kohr, Paul Homer	Arts	127	26½	Columbus
Lambert, Elza Jay	Special	...	33	Plantsville
Latimer, Thomas Erwin	L. & J.	99	25+3	Hilliards
*Lawrence, Osa Alonzo	M. L. Ph.	127	37	Oxford
*Leeper, Charles	E. Ph.	129	3	
*Lentz, Florence	M. L. Ph.	126	80	Marysville
Leonard, Hannah Margaret	L. Ph.	127	19	Columbus
† *Lincoln, Elsie	E. Ph.	129	17½	Woodstock
Lisle, Charles Howard, B. Ph	.....	...	...	Pataskala
Lisle, Thomas G	Com. & Ad.	131	22	Columbus
Long, Mila Myrtle	Special	...	2½	Columbus
Loren, Mary	Special	...	40	Columbus
*Loughrey, John Larison	L. & J.	99	15½	Marysville
Luse, Jessie Edna	E. Ph.	128	99	Columbus
Lyon, Maud Eliose	Special	...	29	Westfield, N. Y.
MacAdam, Lida Allison	Special	...	8	Worthington
Mack, Egbert Hiram	E. Ph.	129	30	Sandusky
Mark, Mary Louise	Arts	127	35	Columbus
Marriott, Robert Henry	Science	129	89	Richwood
*Martin, Franklin Ewing	L. Ph.	127	7	Columbus
Martin, William Kooken	L. Ph.	127	25	Lancaster
Martz, Velorus	Arts	126	103	Columbus
*Matthews, Max Moses	E. Ph.	129	49	Vinton
Mayfield, Victor Hugo	Special	...	3	Prospect
Meade, Caroline Annis	M. L. Ph.	126	78	Columbus
Merkle, Albert Edward	Prep. Med.	100	31	Chillicothe
*Merrick, Lawrence Hildreth	Arts	127	22½	Zanesville
*Miesse, Frank H	L. Ph.	127	49	Chillicothe
Miller, Albert Morris	Special	...	22	Columbus
*Miller, Charles Reed	E. Ph.	128	57	Bellville
Miller, Fred A	E. Ph.	128	104	Columbus
Miller, Gretchen Pauline, B. Ph	.....	...	...	Columbus
*Miller, Paul Scott	Science	130	24½	Marion
Mills, Donald P	Special	...	36	Norwalk
Mitchell, Lynn Boal	Arts	127	41	Piqua
Mitzenberg, Allena May	L. Ph.	126	94	Columbus
Mitzenberg, Fannie Katheryn	L. Ph.	127	33	Columbus
Mock, Marcia Inez	L. Ph.	126	102	Columbus
Malloy, Mary Aloysia	L. Ph.	127	25	Sandusky
Maloney, William Patrick	Special	...	72	Prospect
Moon, Clarence Victor, B. Ph	.....	...	...	Farmer's Station
Moore, Clarence L. E	Science	129	98	Washington C. H.
Moore, Edgar Howard, B. Sc	.....	....	...	Columbus
*Morgan, Roy	E. Ph.	128	70	Greenland
Morse, Max Withrow	Science	130	27	London

† Died March 13, 1900. * Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Morton, Max De Los	Special	...	33	Ashtabula
*Muirie, Frederick John	Arts	126	61	Youngstown
Mull, Ernest Clinton	L. & J.	99	30	Lebanon
Mumma, Marion W	Science	133	108	Dayton
McAllister, Earl Saddler	E. Ph.	128	86	Columbus
McAlpine, Maude A	Special	...	12	Columbus
McCallum, Raymond, B. Ph	.....	...	...	Dayton
McDonald, Joseph Slyvester	E. Ph.	128	98	Rendville
McDowell, James Keen	L. Ph.	127	41	Columbus
*McGugin, Elizabeth Winifred	Arts	127	45	Ohio Furnace
*McKinley, Mary Ann	L. Ph.	127	19½	Trinway
McKinney, Frank C	Arts	126	108	Columbus
McPherson, Clarence Githeus	Science	130	...	Xenia
*McQuigg, Charles Wesley	L. & J.	99	15+8	Pomeroy
*Nachtrieb, Clarence R	L. Ph.	127	22½	Wauseon
Nash, Simeon	Arts	126	103	Columbus
*Needles, Ada Ruckle	Science	129	38	Groveport
Neiswender, Lisle W	Prep. Med.	100	68+2	Grove City
Nichols, Ada May	M. L. Ph.	126	68	Chillicothe
*Nida, William Lewis	E. Ph.	128	92	Lincoln
Norris, John S	M. L. Ph.	126	80	Columbus
*O'Brien, Charles Francis	L. & J.	99	33	Urbana
*Orndorf, Earl Luther	E. Ph.	129	35	Wauseon
*Ortman, Earl Hill	L. Ph.	127	25	New Salem
Orton, Samuel Torrey	Science	133	83	Columbus
Osborn, Abner Andrews, B. Sc	.....	...	...	Columbus
Parmenter, William Watt, B. A	.....	...	...	Mt. Vernon
Parsons, George McLellan	L. Ph.	126	98	Columbus
Patterson, Bertha Gildersheve	Arts	126	105	Columbus
*Pavlicek, Frank J	L. Ph.	126	85	Toledo
*Peoples, Emmet W	Arts	126	21	Pomeroy
Pitts, Grace Lenore, B. Ph	.....	...	...	Columbus
*Plum, Harley Martin	Arts	126	67	Ashville
Plummer, Alice Greenwood	Special	...	17	Columbus
*Pocock, Lucy Hunt	E. Ph.	128	68	Columbus
Porter, George Henry	L. Ph.	126	98	New Philadelphia
*Postle, Carlton David	Prep. Med.	100	33+6	Alton
Postle, Carl Haldy	Com. & Ad.	131	17	Columbus
Potts, Beulah Josephine	Arts	127	29	Columbus
*Potts, Helen Georgiana	Special	...	32	Columbus
Powell, Blanche	Special	...	...	Mt. Cory
*Powell, Cornelia	Arts	127	60	Columbus
*Powell, Raymond Thompson	L. Ph.	127	6	Columbus
*Pratt, Edna Stuart	Arts	127	...	Columbus
Pulling, Margaret Glaze, B. Ph	.....	...	...	Columbus
Pumphrey, Josiah Merton	Prep. Med.	100	64	Martinsburg
*Rathburn, James Irwin	Prep. Med.	100	16	Gallipolis
*Raymond, Maybelle	E. Ph.	128	77	Columbus
*Raymond, Stockton	L. Ph.	127	22	Columbus
Redrow, Clara M	M. L. Ph.	126	50	Williamsburg
Redrow, Walter Leffingwell, B. Sc	.....	...	...	Williamsburg

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Rees, Edith Celeste	Arts	126	104	Columbus
*Reese, David R.	Arts	126	94	Shawnee
Reinhard, Frank J., Jr.	E. Ph.	128	40	Columbus
Reutinger, Ernest Victor	Prep. Med.	100	62+8	Chillicothe
Rice, Mary Washington, B. A.	.....	...	...	Columbus
Rickard, Alexander	Special	...	5	Columbus
Rickey, Tallmadge Archer, B. Ph.	.....	...	...	Columbus
*Ridenour, Walter Ashton	L. & J.	98	52+13	Jackson
*Robinson, John Fletcher	Prep. Med.	100	26+5	Columbus
*Rockey, Noble Warren	E. Ph.	129	21	Dayton
*Rodebaugh, Mabel Mary	M. L. Ph.	127	22	Marysville
Roebuck, Carl Fletcher, B. Ph.	.....	...	...	Dalton
Roekel, Frederick Augustus	Prep. Med.	100	27	Zanesville
Roney, Mary Malvina	L. Ph.	126	103	Columbus
Ruebesh, Joseph Keiffer	Special	...	31½	Dayton
*Rushton, Norman	Com. & Ad.	131	56	Selkirk, Ontario
*Sadler, Anna Belle	L. Ph.	126	74	Columbus
Salm, Edna Esther	L. Ph.	127	39	Columbus
Sayre, Charles Boyd, B. A.	.....	...	...	Columbus
Schaff, Mae B., B. Ph.	.....	...	...	Columbus
*Schantz, Albert J.	Science	135	66	Dayton
Schilling, Emelia Jahana	Special	...	10	Columbus
*Schneider, Earnest True	L. & J.	99	25½	Dayton
Schoedinger, Ferdinand P.	Arts	126	74	Columbus
*Schönthal, Derso Clarence	E. Ph.	128	60	Columbus
Scott, Dudley, B. Ph.	.....	...	...	Columbus
*Seymour, Edith Lillian	Arts	127	27	Columbus
Seymour, Raymond Jesse, B. Sc.	.....	...	...	Columbus
*Schaeffer, Ray	Arts	127	19½	Coshocton
*Shaw, Harry R.	E. Ph.	128	85	Zanesville
*Sherman, Richard Jay	Arts	127	35	Toledo
Shigley, Anna B.	Special	...	29	Jamestown
Simpson, Warner Pike	Prep. Med.	100	34	Worthington
Singleton, Charles T., B. Ph.	.....	...	...	Columbus
Smith, Albertine Charlleen, B. Ph.	.....	...	...	Columbus
*Smith, Harold Osborn	L. Ph.	126	64	Columbus
Smith, Lida May	Special	...	1	Columbus
Smith, Ralph Harvey	Prep. Med.	100	19	Columbus
Smith, Stanley Robb	Special	...	18	Columbus
Smith, Virginia Roletta, B. Ph.	.....	...	...	Columbus
*Snyder, Henry Williams	E. Ph.	129	24½	Ironton
Souder, Charles Granville	Science	130	5½	Logansport, Ind.
*Southwick, Myrtle Minerva	E. Ph.	129	16	Kendallville, Ind.
*Southworth, Ruth	E. Ph.	129	27	Columbus
Sperry, Wilmot, Jr.	E. Ph.	128	91	Mt. Vernon
Sproat, Martha Evans	L. Ph.	127	37	Columbus
*Staley, Homer F.	Arts	126	48	Columbus
Stephenson, Bertram Sheaver	L. Ph.	126	96	Jackson
*Stevenson, Ray David	Special	...	62	Fostoria
*Steward, James Clarence	E. Ph.	129	29	Marcy
*Stewart, George Francis	L. & J.	99	9½	Coshocton

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
*Stewart, Gilbert H., Jr.	L. & J.	98	47	Columbus
Stimson, George, B. A.	.....	...	...	Columbus
*Stults, Newton Delano	E. Ph.	129	...	Fremont
Sullivan, Oscar M.	Arts	126	72	Columbus
Swaney, Sara C.	L. & J.	98	61+1	East Liverpool
*Swift, Samuel Ferguson	E. Ph.	128	47	Jackson
*Tarbill, John Wesley	Arts	126	114	Atlanta
*Tatje, Oral D.	Prep. Med.	100	34	Columbus
Taylor, Bessie Battelle	L. Ph.	126	70	Columbus
*Taylor, Mary Hill	L. Ph.	127	33	Columbus
*Taylor, William Harry	E. Ph.	128	74	Columbus
Teter, Sumner	Science	129	63	Columbus
*Teter, Millicent	M. L. Ph.	127	12	Columbus
Thomas, Lawrence David, B. Ph.	.....	...	...	Lancaster
Thomas, Robert Park	Special	...	...	Kennard
*Thompson, King Gibson	Special	...	74	Georgetown
*Thompson, Roy Washington	L. Ph.	127	27	Gallipolis
Tietjens, Otto	Com. & Ad.	131	...	Napoleon
Tilden, Samuel Jay	Special	...	28½	Garrettsville
*Tilton, Josephus Howard	E. Ph.	128	110	Jelloway
Timberman, Andrew	Special	...	...	Columbus
Tipton, Robert	Special	...	...	Milo
Trauger, Bertha Elizabeth	Special	...	6	Columbus
Trauger, Clara Salome	Special	...	7	Columbus
Travis, Fred L., B. A.	.....	...	...	Pana, Ill.
Travis, John F., B. A.	.....	...	...	Green Camp
Türcke, Therese	Special	...	12	Columbus
Turner, Bertha Louise	M. L. Ph.	126	38	Columbus
Turner, Lucile E.	Special	...	...	Columbus
*Ulsamer, Fritz Martin	M. L. Ph.	127	5½	Gallipolis
*Veach, Esther Louise	E. Ph.	129	23½	Newark
Vinson, Albert E.	Special	...	116	Dayton
Wagner, Charles John	Special	...	13	Belle Centre
Wallace, William Garvey	Special	...	...	Bellefontaine
Walsh, Frances Lyon	Arts	126	40	Columbus
Walters, Barton	Special	...	32	Circleville
Ward, Annette Persis	Special	...	26	Columbus
*Ward, Lila Lucile	L. Ph.	126	90	Reynoldsburg
*Warner, John Howell	Arts	127	25	W. Shelby, N. Y.
Waugh, Helen Grace	L. Ph.	129	16	Bowling Green
*Weaver, Mima Jacobs	E. Ph.	131	41	Dayton
Weber, Sophia Frances	Special	...	31	Columbus
Weick, Carrie Rosina	Science	129	104	Columbus
Weld, Harry Porter, B. Ph.	.....	...	...	Marysville
*Weller, Charles Ralph	L. Ph.	127	...	Portsmouth
Welling, Faith Cornelia	Arts	126	94	Worthington
*Wells, Byron Bliss	Science	129	59	Ostrander
*Wells, Harry B.	Arts	126	40	Columbus
West, Earle Downs, B. A.	.....	...	...	Columbus
Whetsel, James Anderson Garfield	Arts	127	30	Columbus
*Whitaker, William Earl	E. Ph.	128	99	Wauseon

* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
*White, Carroll Agnew	L. Ph.	126	45	Marysville
Whiteside, John Wesley	E. Ph.	128	93	Bloomingburg
Wilkinson, John Anderson	L. Ph.	127	33	Piqua
*Williams, Anna Florence	E. Ph.	129	26	Jackson
Williams, Clara Maude, B. Ph	.....	...	...	Columbus
Wilson, Charles Robert	L. & J.	99	26	Circleville
*Wilson, Willard Aleck	Com. & Ad.	131	25	Columbus
Wing, Lucius Arthur	Science	130	35	Columbus
*Woods, William Burroughs	L. & J.	99	36+3	Garrettsville
Wright, Nellie	E. Ph.	128	80	Worthington
Yoder, Harvey Elmer	Special	...	11	North Industry
*Young, Claude Burnett	L. Ph.	127	27	West Rushville
*Young, Mary Grace, B. Ph				Mt. Vernon

* Preparatory work incomplete.

COLLEGE OF ENGINEERING

GRADUATE STUDENTS — 11

	Course	Home Address
Edwards, Clarence J. B. S. Pacific College.	Cer. S	Newberg, Ore.
Ford, Nile Otis A. B. Washington and Jefferson.	E. M	Wheeling, W.Va.
Grate, Charles A. M. E. Ohio State University.	M. E	Yale.
Groves, John Wesley C. E. Ohio State University.	E. M	Batavia.
Hale, Frederick James M. E. Ohio State University.	M. E	Mogadore.
Ludlow, Stephen H. B. S. Albion College.	*Cer	Union City, Ind.
McIntire, Alfred Heber E. E. Ohio State University.	M. E	Mt. Vernon
Schlochtermeyer, Carl Fred A. B. St. Xavier College.	E. E	Cincinnati
Somermeir, Edward Everett G. Ph. Ohio State University.	E. M	Westwood
Williams, Ira A. B. S. Iowa State College.	*Cer	Ames, Iowa
Wynne, Francis Edmund B. A. and M. A. Bethany.	E. E	Bethany, W. Va.

* Pursuing a special course.

UNDERGRADUATES — 394

	Course	Course Hours	Credit Hours	Home Address
Albin, Carl	E. E.	219½	52	Columbus
Alford, Arthur Milton	M. E.	22	138+4	Windham
*Ames, Holiday	C. E.	209	34+3	Ashland
*Archer, Carl Hunter	E. E.	219½	...	Columbus
Armstrong, Hugh Cook	E. E.	219½	43½+3	Clintonville
Arndt, Mrs. Mary Korst	Special	...	2	Columbus
*Arnold, Charles H	M. E.	222	91	New London
Bahrke, Charles Frederick	I. A., S.	96	35	Columbus
Bailey, Ervin George	E. E.	218	92	Damascus
*Bailey, Edward Harding	†M. E.	...	66	Damascus
*Bailey, Purdy Sanford	C. E.	210½	29½+5	Warren
*Baker, Charles Carroll	E. E.	219½	...	St. Paris
*Balz, Ernest	C. E.	209	98	Columbus
*Balz, Louis Christian Fred	C. E.	209	98	Columbus
Barker, Russel David	M. E.	223½	43½	Brooklyn, N. Y.
Barlow, Moses Henry	C. E.	209	159	Columbus
*Barringer, John Martin	Chem.	202	136	Washingt'n, D.C.
Barringer, Lawrence Eugene	Cer.	211	170+5	Washingt'n, D.C.
*Barry, William John	C. E.	209	78	New Straitsville
*Battenfield, John Milton	E. E.	218	68½	Delaware
*Baughman, Norman	E. E.	219½	42	Roseville
Baumann, John Carl Bernhardt	†Min'g, S.	...	59+21	Gütersloh, Germ.
*Bauroth, Walter John	M. E.	222	83	Springfield
Beard, Frank Andrew	I. A.	222	38	Jacksontown
*Bedwell, Charles Francis	E. E.	218	46	Columbus
Benbow, James D	I. A., S.	96	47	Milo
Berndroth, Geary Martin	M. E.	223½	45	Geneva
*Berry, Charles Watson	E. E.	219½	19	Columbus
Besse, Thomas Samuel	E. E.	219½	...	Pataskala
*Bigelow, Clarence C	E. M.	208	103½	Findlay
Billingsley, Robert Wallace	M. E.	222	99	Lisbon
*Bleininger, Albert Victor	†Chem.	...	126+31	Columbus
Boehme, Adolph Joe	M. E.	222	157+3	Youngstown
Bomesberger, Walter Nelson	E. E.	219½	45½+5	Columbiana
Boothman, Dale Maxwell	M. E.	223½	55½	Bryan
*Bostwick, Oliver Newton	C. E.	209	93	Mt. Sterling
Bott, George Robert	M. E.	222	156	Columbus
Bowden, Harry William, C. E				Minerva
*Boynton, Henry Percy	E. M.	209½	14½+1	Elyria
Bradshaw, Eugene Bingham	Special	...	...	East Liverpool
*Bramble, Bennett Glenn	Chem.	209½	...	Bellefontaine
Brannan, Thomas Hayes	C. E.	210½	42+3	Marysville
*Brashear, Edward Rosemond	C. E.	210½	54½	Columbus
*Bridinger, Leon A	E. M.	209½	22½	Tiffin
*Britton, William Miller	E. E.	219½	28+13	Columbus
Britton, Lloyd C	C. E.	209	88	Williamsburg
Brooks, Herbert Barton	E. E.	218	111+6	Piqua
Buchenberg, Alvin Ernest, M. E. in E. E.	.....	...	...	Holgate

† Pursuing a special course.
* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Burch, Orrin	E. E.	218	63½	Columbus
Buydden, Wade Jennings, Jr.	E. M.	209½	7	Dayton
*Cameron, James L.	Arch.	217½	47½+2	Malvern
Cameron, Harry Ezra	C. E.	209	159	Lisbon
Cameron, Gaylor Malcomb	E. E.	219½	41	Jeromeville
Campbell, Willis Elmer	Chem.	208	92	Fostoria
Campbell, Rolo Wilbur	C. E.	209	53	Fostoria
Cannan, William	†Cer.	...	75	Plymouth
*Carmichael, Robert	M. E.	223½	29	Columbus
*Carr, William Brewster	E. E.	219½	...	Yellow Springs
Cartzdafner, Roy Edwin	M. E.	223½	53	London
*Caskey, George Alexander	M. E.	222	96	Columbus
Cavanaugh, Andrew Francis	M. E.	...	...	Dayton
*Cavin, Frank Thomas	E. E.	218	116	Spencer
*Chaffin, Wendel Wilson	C. E.	209	57+12	Dayton
*Chamberlain, John Ross	C. E.	209	56	Tiffin
Chandler, Homer Payne	E. E.	218	95+13	Columbus
*Chandler, William H.	C. E.	210½	...	Bellefontaine
Chenoweth, Howard	†E. E.	...	56	Range
Childs, Harry Jesse	C. E.	210½	21½+6	Troy
Chubb, Joseph Horace	C. E.	210½	47	Columbus
Clarke, James Ulrick	E. E.	218	111	Lancaster
Colgan, Frank J.	Cer., S.	90	30+52	Columbus
Conrad, Vern Louis	C. E.	209	104+6	Columbus
*Cook, Spencer Nye	E. M.	208	50½	Chillicothe
*Cooke, Royal Alstan	E. E.	219	132+10	Wyoming
Cooley, James Riddile	E. E.	219½	50½	Nelsonville
Cooper, Ralph McClelland	I. A., S.	96	15	Struthers
*Copland, James Samuel, Jr.	†M. E.	...	7	Dresden
Cosley, Harvey Harter	C. E.	209	154	Troy
Crabill, Pearl P.	†M. E.	...	86	Springfield
Crable, Arthur	C. E.	209	180+5	Columbus
Crable, George	E. M.	208	107	Columbus
Creed, Frank Roy	Mining, S.	91	27	Struthers
Cridland, Harry Clifford	E. E.	219½	55½	Dayton
Crooks, Thomas Elliott	E. E.	219½	55½	Van Wert
Cryder, Howard Michael	Arch.	215	69	Chillicothe
Cryder, Ross Warner	E. E.	219½	35½	London
Damon, Owen H., C. E.	.....	...	...	Hinckley
*Dann, Walter M.	E. E.	218	112	Columbus
Darrah, John Francy	E. E.	219	31½+2	Toronto
Davison, Holmes Bergen	Cer., S.	90	...	South River, N.J.
*Day, Stanley Frank	E. E.	219½	9½	Columbus
*Denmead, Edward Graham	M. E.	223½	32+3	Columbus
*Denny, Charles Wampler	E. E.	219	136	Middletown
DeWolf, Roger Dennison	E. E.	219	164+2	Madison, Ga.
Dick, Owen Quinton	I. A., S.	96	33+4	Marshall
Dickenson, Morris L.	†I A.	...	...	Columbus
*Diehl, Joseph A.	C. E.	209	81+8	Defiance
*Dierdorff, Percy Cyrus	M. E.	222	70	Columbus
Dill, Raymond	E. E.	219	162+3	Columbus

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* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
*Doty, Charles Wilgerson	E. M.	209½	11+5	Hanging Rock
Drummond, William George, M. E.	.....	...	...	Cleveland
Dunlop, Robert Rowse, M. E. in E. E.	.....	...	...	Columbus
*Dupuy, Benjamin Francis	C. E.	210½	52½+8	Ironton
*Ecker, Harrison Grant	E. E.	218	53½	Columbus
*Edgerly, Raymond John	C. E.	210½	39½+6	Pataskala
*Elliott, Emmett Foster	Arch.	215	103	Chester Hill
Elsner, Richard E	C. E.	209	61+4	Newark
Emswiler, John Edwin	E. E.	219½	54½	Morgan Center
Erdmann, William	I. A.	201	191+10	Chillicothe
Escobar, Raphael	†Min'g, S.	...	22	Puerto Principe, [Cuba
*Espy, Frank	†E. E.	...	104	Kenton
Euchenhofer, Albert John	E. E.	219½	39	Dayton
Evans, Charles Hopkins	Mining, S.	91	45	Evanston
*Evans, William Ruthrauff	M. E.	223½	...	Salem, Va.
*Eysenbach, Louis, Jr	Ceramics	214½	51½	Delphos
*Faulkner, Eldridge Rhodes	E. M.	209½	9½	Tippecanoe City
Faulkner, Samuel Starrett	E. E.	219½	...	Troy
*Fay, Sherman	M. E.	223½	55½	Wyoming
Fickes, Walter M., E. M in Ceramics	.....	...	...	Steubenville
Fleming, Joseph Hamilton	C. E.	209	99+24	Olentangy
Follett, George Alfred	C. E.	209	83+17	Columbus
Foster, George C	E. M.	208	107+2	Schooley
Foster, Vause	E. M.	209½	51½	Higby
*Fox, Lewis	C. E.	210½	26½+6	Payne
Frame, Rollo St. Clair	C. E.	209	159	Washington
Frankenberg, George T	M. E.	222	109	Columbus
Frechtling, Arthur George	M. E.	222	166+4	Hamilton
Freer, Will Davis	Cer.	211	49+4	Cortland
*Friedland, Francis William	M. E.	222	64½	Coalton
Frost, George Winfield, M. E.	.....	...	...	Columbus
Fulton, James Stewart	M. E.	223½	55½	Steubenville
*Funk, Leo William	M. E.	223½	41½+5	Chester Hill
Gates, Ellis Day	Cer., S.	90	45+25	Hinsdale, Ill.
Geren, Arthur G	Mining, S.	91	33+10	Columbus
Gilchrist, Edward Luce	E. E.	218	76	Ashtabula
*Gleichauf, Frank S	Arch.	215	103	Newark
*Goodell, Frank Herbert	Chem.	211	93	Columbus
*Gould, William Stewart	M. E.	223½	50½	Wyoming
*Gray, Thomas M	M. E.	223½	30	Pittsburg, Pa.
Green, Homer Stewart	E. E.	218	122	Raymond
Grindel, Charles Stanton	E. E.	219½	39½	Jacksontown
Hager, LeRoy William	C. E.	209	132	Piqua
*Hall, Robert Gilbert	E. M.	209½	21	Dayton
Halsema, Eusebius J	C. E.	210½	52+4	New Bremen
Halverstadt, Herbert	Cer.	214½	34½	Columbiana
Hamilton, Ross Elroy	C. E.	210½	52	Keene
Hammond, John Miller	C. E.	209	104+2	Columbus
Hance, Harry Thomas	Chem.	202	156	Columbus
Hapgood, Eugene Palmer	Chem.	202	118	Sabina
Hardy, Paul	E. M.	208	87½+5	Columbus

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* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
Harkins, Robert Rusk, M. E.	.....	...	...	Columbus
Harmar, Frederick Sturgis	Mining, S.	91	20	Columbus
Harrop, Carl B	E. M.	208	107	Columbus
Harvey, Clarke Kenerly	C. E.	210½	53+3	Brownsville
*Hatton, Frederic George	Arch.	217½	11	Columbus
Hayman, Will Clayton, M. E. in E. E.	.....	...	...	Holgate
Hayes, Charles Bradford	E. E.	219½	55½	Hilliards
Hedges, Benson Rice	M. E.	222	107	Columbus
Helvey, George Stanley	M. E.	223½	53	Hamilton
*Herrick, Hobert C	Chem.	209½	19	Wellington
*Hershey, Herbert Clover	I. A.	222	4	Columbus
Hill, Harry Earl	C. E.	210½	100	Richwood
Hill, Cortland Latimer	C. E.	209	47	Berlin Heights
Hirst, Harry	E. M.	208	93	Midvale
Hitch, James Frank	C. E.	209	104	Batavia
Holbrook, George Frederic	E. M.	208	97	Bucyrus
*Holloway, Thurman Welferd	E. E.	219½	42½	Zanesville
Horn, Charles Curtis	E. E.	219½	...	Pipesville
Hoster, Herman A	M. E.	222	43½+6	Columbus
*Howard, Oscar David	Arch.	212	100+40	Circleville
*Huddleson, Frank	†E. M.	...	129	Columbus
Hulbert, William Rowsell	M. E.	222	79½+3	New York, N.Y.
Hull, Walter Austin	Cer.	211	107+8	Orangeville
Hummel, Edmund Ray	E. E.	219½	2	Carroll
*Hunter, James Williamson	C. E.	210½	54½+5	Zanesville
Hunter, Madone Carrington, M. E. in E. E	.....	...	...	Norwich
*Hylton, Gratwoods Walter	†M. E.	...	60	Springfield
Jackson, Charles Edwin	Cer. S.	90	45+3	Wheeling, W.Va.
Jackson, Elmer Collins	C. E.	210½	4½	Columbus
*James, Frank Richard	E. M.	208	82	Columbus
Johnson, Earl S., M. E. in E. E.	.....	...	...	Plants
Johnson, Walter A	M. E.	222	109	Columbus
*Johnston, Edward G	M. E.	223½	23+3	Bangor, Mich.
Jones, Howard Martin	E. E.	218	113	Marysville
*Jones, James Albert	C. E.	210½	38	New Straitsville
Judson, Walter Raymond	E. E.	219½	55½	Dayton
Kanmacher, Samuel Houston, M. E. in E. E	.....	...	...	Columbus
*Keating, Harvey Thomas	Chem.	208	100	Columbus
Keim, Herbert Edward	C. E.	210½	37½+2	Cleveland
Keller, Daniel Casteel	E. E.	218	54	Washington C. H.
Keller, William	E. E.	219½	20½	Washington C. H.
Kennedy, William McCreery	Cer. S.	90	10	New Brighton,
Kern, William Frederick	Chem.	208	107	Bellaire [Pa.
Kettering, Charles Franklin	E. E.	218	54	Loudonville
Kettler, Frank Christian	E. E.	209	155	New Bremen
*Kidder, Leonard	C. E.	210½	...	Woodstock
*Killinger, Claud H	C. E.	210½	7	Toledo
*Kimmel, Fred Bernham	E. E.	219½	46½+3	Van Wert
King, Francis Emmet	Mining, S.	91	89+10	Leisenring, Pa.

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* Preparatory work incomplete.

	Course	Course Hours	Credit Hours	Home Address
King, Herbert Sumner	C. E.	209	181+9	Medina
*Kinnear, Harry Baldwin	Chem.	208	88	Mt. Sterling
*Kinnison, Ernest Eugene	C. E.	209	99	Jackson
Kirker, Gaylord B	Mining, S.	91	88+19	Catlettsburg, Ky.
Kittle, James Monroe	M. E.	223½	66½	Columbus
Klie, Walter	M. E.	223½	48	Columbus
Knieling, Charles August	E. E.	218	103+2	Willoughby
*Knies, Daniel	E. E.	218	71½	Columbus
Knight, William Abner, M. E.	.....	...	...	Columbus
*Knoderer, Homer Guy	E. E.	218	112	Columbus
Knox, Frank S., E. M.	.....	...	...	Columbus
Krumm, Thomas Zettler	C. E.	209	83	Columbus
Kunkle, Fred Raymond	E. E.	218	79+14	Bryan
*Laiblin, Garfield	M. E.	222	80	Canton
Lamb, Whitney Earl, M. E. in E. E.	.....	...	...	Commercial Point
*Lampert, John Martin	M. E.	222	96	Xenia
*Lanning, Adrian Roy	C. E.	209	17	Dennison
Lee, Corlis Edgar, M. E. in E. E.	.....	...	...	Pugh Postoffice
*Leinbaugh, George Gurden	M. E.	220	160+3	Bellevue
*Lesh, John Howard	M. E.	220	146	Louisville
*Lied, Ernst Mitchell	E. E.	218	72	Columbus
Linville, Clarence Philander, B. Sc. in Chemistry	.....	...	...	Urbana
Linxweiler, Otto	M. E.	223½	43½	Dayton
Lloyd, Donald K.	Mining, S.	91	5	Columbus
Lockwood, Howard Thomas	C. E.	209	92	Batavia
Loewensohn, David	C. E.	210½	42½	Urbana
Long, George Garfield	E. M.	209½	54½	Tippecanoe City
*Luse, Herbert James	M. E.	223½	12	Columbus
Lyon, Arthur Hollingshead, M. E.	.....	...	...	Wauseon
*Marckworth, Otto Stanley	†Chem.	...	168	Cincinnati
Marietta, Harry Riefsnider	E. E.	218	100+3	Dayton
Marriott, John Minges	Arch.	215	82½	Delaware
*Marshall, Charles Howard	M. E.	223½	41	Fair Haven
Marshall, Willard Beverly, M. E. in E. E	.....	...	...	Piqua
Martin, John D., Jr	M. E.	222	174+19	New Straitsville
Marting, Samuel Arthur	†Chem.	...	7	Portsmouth
Mason, John T	†Chem.	...	25	Columbus
Maxwell, Howard McGee	E. E.	219½	10½	Columbus
*Melick, Cyrus Alan	C. E.	210½	54½	Columbus
Melick, Neil Albert, C. E.	.....	...	...	Columbus
Mercer, Robert Wood	E. M.	209½	51½	Chester Hill
*Miller, Albert Sanford	E. M.	209½	20½	Tiffin
Miller, Charles Emmitt	Arch.	212	150+5	Spencer
*Miller, Ralph Charles	C. E.	209	138+11	Zanesville
*Minor, Wells Hammond	E. M.	209½	54½	Akron
Moist, Harvey Clinton	E. E.	219½	...	Kinsey
Monserrat, Charles R.	M. E.	223½	31	Columbus
Mooney, George Lewis	E. E.	219½	55½	Woodsfield
*Mooney, William Joseph	C. E.	210½	11½+3	Cleveland

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	Course	Course Hours	Credit Hours	Home Address
*Morlan, Wilbert	†M. E.	...	91+7	Rogers
Morris, Robert Hamilton	E. M.	209½	135+20	Columbus
Morris, Samuel	E. E.	219½	12½	Bloomingburg
Morris, Willard Bernard	M. E.	222	91	Columbus
*Morris, William Blaine	M. E.	222	109	Massillon
Morrison, Franklin Houston	Cer. S.	90	45+10	Denver, Col.
*Murphy, Joseph Lincoln	C. E.	210½	49½	McArthur
Myers, Albert B., E. M	.....	...	...	Columbus
Myers, Fred	C. E.	210½	44½	Louisville
McComb, Hoyts Sherman	E. E.	219½	41	Columbus
*McEowen, Hugh Elsworth	C. E.	210½	17+9	Greenville
*McFarland, Horace M	E. M.	208	97	Columbus
McIntosh, Roscoe Everitt	E. E.	219	158+5	Ravenna
McKeon, Robert Dale	C. E.	209	99	Arcanum
*McKinlay, William Shields	E. E.	218	7	Denver, Col.
*McMullin, Roy	E. E.	219½	24	Columbus
*McOwen, Thomas	C. E.	210½	47+34	Ovid
*McWhinney, Harry Ozias	E. E.	219½	18½+15	Lewisburg
*Nauss, Ralph Welty	Chem.	202	153	Greenville
Needham, Harry Smithson, M. E.	.....	...	...	Columbus
Nicholson, Charles Marion, M. E. in E. E	.....	...	...	Columbus
*Nidy, Herbert C	E. E.	219	162+2	Greentown
Nobles, Edwin Earl	†C. E.	...	24	Flint, Mich.
Nold, John H., E. M	.....	...	...	Columbiana
*Nye, Ralph D	E. E.	219½	52	Zanesville
Ogden, Ellsworth	M. E.	223½	64½	Columbus
*Ohliger, Clyde C	C. E.	210½	14	Wellsville
Osborn, Liphe Andrews	M. E.	223½	47	Columbus
O'Shaughnessy, Joseph	I. A., S.	...	96	Columbus
*Panter, Thomas Alfred	E. E.	218	104	Niagara Falls,
*Parkin, William Z	M. E.	222	77	Columbus [N. Y.
Parrett, Benjamin Creamer	Chem.	208	91	Washington C. H.
Patton, William Arthur	M. E.	223½	9½	Circleville
Peck, Alfred Steven	Mining, S.	91	53	Cleveland
*Perks, George Wheldon	M. E.	222	85	Springfield
Peterson, John William	Arch.	217½	54½	Port Clinton
Pleukharp, Erwin Hiram	I. A., S.	91	42	Columbus
Pope, Mrs. Edna L	Special	...	2	Columbus
*Post, Malcolm Phelps	Cer.	211	83+10	St. Louis, Mo.
Poto, Frank B	Chem.	202	167	Alliance
Potts, Royal Warren	†C. E.	...	29	Columbus
Pratt, Fred Kellogg, C. E	.....	...	...	New Philadelphia
Price, Fred Raymond	E. E.	219½	34½	Columbus
Reed, Nathaniel Garfield	M. E.	223½	55½	Youngstown
Reel, Walter C	C. E.	210½	9½+3	Columbus
Rennard, John Hiram	Mining, S.	91	44+1	Wheeling, W. Va.
*Riebel, Leroy Clemens	Arch.	217½	37½	Columbus
Rightmire, Robert Elwood	M. E.	222	120+6	Wheelersburg
Ritchie, George Alexander	C. E.	210½	38½	Hudson
Robinson, Robert Thane	E. E.	219½	17½	Bryan

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	Course	Course Hours	Credit Hours	Home Address
Rogers, Rutherford Hayes	E. E.	218	46+5	Columbus
*Romick, Howard Samuel	M. E.	223½	...	Hilliards
*Ross, Calvin Burt	E. E.	219½	55½	Urbana
‡ *Ross, Edward McKinstry	M. E.	223½	24½	Jerseyville, Ill
*Roth, George Lewis	E. E.	219½	16	Port Clinton
*Roudebush, Howard John	E. E.	219½	26	Owensville
*Rupert, Jesse Solomon	E. E.	219½	7	New Waterford
*Ryland, Paul Dillen	C. E.	209	189+2	Columbus
Sanderson, Clarence Herbert	E. E.	218	94	Logan
*Sanderson, Ray Rochester	E. M.	208	70+6	Washington C. H.
Sayers, Delbert Bancroft	E. M.	208	105+9	Marits
*Schlafly, Raydeon Karl	C. E.	210½	69½	Mt. Eaton
Schoenlaub, Thomas Jacob	C. E.	209	77	Marion
*Schott, Alvin Christian	Chem.	208	56	Massillon
Schreiber, George Ernest, M. E. in E.E.	.....	...	...	Ironton
Schubert, Charles Wesley	C. E.	210½	54½	Columbus
Schwab, Frank Wilbert	Chem.	208	94	New Philadelpiha
*Scott, Cyrus Ellison	E. M.	209½	39½+9	Columbus
Scott, James Blaine	E. E.	219½	10½	Batavia
Senter, Herbert Pike	C. E.	209	104	Columbus
Sessions, Elizabeth	Special	...	...	Columbus
Sharp, John McDowell	C. E.	210½	36½+2	Columbus
*Shaw, Lucian	C. E.	209	72+3	West Lafayette
Shepherd, Charles William, C. E.	.....	...	...	Huron
Sherman, John K	C. E.	209	154	Columbus
*Sherwood, Frank Porter	†E. E.	...	128	Ashtabula
Shumate, Frank Douglass	M. E.	222	94+2	Urbana
Siddall, John William	Mining, S.	91	45	Streator, Ill.
*Sigrist, Charles Ferdinand	C. E.	210½	42½+10	Congress
*Simpson, Henry Jerome	C. E.	209	58+3	Worthington
*Singer, Lewis Parmlee	E. E.	219½	16½	Lewisburg
*Sinks, George Theodore	M. E.	223½	20	Youngstown
Smith, Harry Ford	M. E.	222	109	Lexington
Smith, Roy Brooke	M. E.	223½	56½+2	Columbus
Sosman, Robert Browning	Chem.	209½	56½	Chillicothe
Sowers, Emory Blose	I. A.	222	52	Westville
Spangler, Thomas McClellan	†C. E.	...	23	Pleasantville
Sproat, Amasa Delano	E. M.	208	107+8	Chillicothe
Stanton, Frederic Moses	Chem.	209½	21+15	Ridgeville
Starbuck, John Clancy	I. A., S.	96	16	Somerton
*Sterling, James Gilman	M. E.	222	101	Springfield
*Stocker, James Arthur	C. E.	209	104	Gnadenhutten
Stone, Thomas Wade	M. E.	222	100½	New Bremen
Stout, Wilber	Cer., S.	90	40+15	Sciotoville
Strong, Harry Miller	†Min'g, S.	...	39	Wilkesville
Strong, Jonathan Edgar	M. E.	223½	16½	Columbus
*Stull, Raymond Thomas	Cer.	211	101	Elkland, Pa.
*Talbot, Edgar Carl	E. E.	219½	...	Columbus
*Tanner, Edward Wood	M. E.	222	104	Zanesville
Taylor, William Oliver	E. E.	219½	55½	Urbana

† Pursuing a special course.
* Preparatory work incomplete.
‡ Died August 13, 1900.

	Course	Course Hours	Credit Hours	Home Address
*Templin, John Richard	E. E.	219½	42½	Salem
Thomas, Alfred Redman	Mining, S.	91	87	Glouster
*Thomas, Edward	Chem.	209½	37½	Navarre
*Thornton, Nyman	M. E.	223½	47½	Wyoming
Trish, George	Mining, S.	91	88	Nevada
Tubbs, Alfred Stowe	Mining, S.	91	38	Tubbsville
*Tudor, Glenn E.	C. E.	210½	42½+3	Chicago
Tyler, John Sherrerd	M. E.	223½	42+12	Dayton
Van Dyke, Clifford Steel	E. E.	219	160	Ansonia
*Van Schoyck, Ray	M. E.	223½	...	Hilliards
*Van Tine, Charles Hovey	M. E.	223½	62	Tiffin
Vosskuehler, Joseph Henry	M. E.	...	...	Dayton
*Waddell, Starling	E. E.	218	55	Columbus
*Walker, Walter Hamilton	E. E.	219½	2	West Canaan
*Walsh, George E.	M. E.	223½	13	Columbus
*Ward, Samuel Edwin	M. E.	223½	56	Green Spring
*Ward, Vernon C., Jr.	M. E.	222	72	Columbus
*Warnock, David Ross	E. E.	219½	4½	Urbana
*Webber, Frank Merrill	E. E.	219½	32	West Richfield
Weber, Frederick Clarence	Chem.	202	138	Evanston
*Weidman, Charles Albert	E. E.	219½	21	Navarre
*Weiss, William Winfred	C. E.	210½	33½	Canal Dover
Wellbaum, Arvy E.	M. E.	222	109	Brookville
*Wells, Ralph P.	M. E.	223½	14½	Lisbon
*Whetsel, Emerson Jay	C. E.	209	82+5	Jackson
*White, Frederick Lewis	M. E.	223½	...	Gambier
Wiel, Arthur Bernard	Special	...	17	Cleveland
Wilcox, Carl Clifford	M. E.	223½	47	Columbus
*Wildermuth, Troy Dreslan	M. E.	223½	2	Columbus
Williams, Harry Ernest	M. E.	222	109	Harlem
*Williams, Howard Insco	C. E.	209	39+4	Dayton
Williamson, Homer Davison	Chem.	202	179	Monroe
*Wilson, James Sommerville	M. E.	222	162+22	Columbus
Winger, Stanley DuBoise	M. E.	222	92½	Springfield
Wittich, Manuel	Cer., S.	90	20+5	Mt. Sterling
Wolf, Richard Ludwig	Cer., S.	90	45+17	Detroit, Mich.
Wright, John	Cer., S.	90	20	Antrim, Pa.
Wright, Lawrence Robert	E. E.	219½	30½+18	Gambier.
Wright, Otis H.	E. E.	219½	47½	Worthington
*Wyer, Samuel S.	M. E.	223½	48½	Barberton
Yost, Benjamin Franklin	†Min'g, S.	...	...	Columbus
Yost, Lloyd	M. E.	222	103	Somerset
Youmans, W. Raymond	E. E.	219½	53½	Pataskala
Zbinden, Hermann Christian	C. E.	210½	130+6	Toledo
*Zeller, Ralph	E. M.	209½	66½	Ottawa
Zwerner, Fred George	E. E.	219½	54+6	Columbus

† Pursuing a special course.
* Preparatory work incomplete.

COLLEGE OF LAW

UNDERGRADUATES — 201

	Year	Home Address
Addison, Arthur Everet	Third	Columbus
Addison, Clarence Maywood	Third	Columbus
Alvord, Justus Elvin	Second	Bryan
Amos, Frank Craig	Second	Sidney
Anderson, Ralph	First	Dennison
Armstrong, Russel Livingston	Third	Celina
Arnold, Harry Crumley	Second	Columbus
Ashman, Frank	Second	Coshocton
Baggott, Roland Webb	Third	Dayton
Bamer, Merton Leonard	Second	Grand Rapids
Barnet, Clarence Elwood	First	New Paris
Beatty, Robert Jay	Second	Cardington
Bechtol, John M	First	Fayette
Beetham, Rupert Rennison	Third	Cadiz
Benedict, Charles Yeddo	Third	Mansfield
Berry, Edmond Franklin	Second	Celina
Bininger, James Wolfgang	Third	Lancaster
Bock, Theodore E	Second	Hamilton
Bolton, Thomas Bennett	First	Cleveland
Bostwick, Homer Z	First	Columbus
Bowden, Harry W	Special	Minerva
Bowers, Walton S	Second	Hamilton
Branum, Frank C	First	Bridgeport
Bright, Frederick Ijams	Third	Logan
Brown, Albert Marion	First	Wauseon
Brown, James Earl	Second	De Graff
Burgess, James Henry	Second	Big Horn, Wy.
Burkey, Charles Paul	First	Pleasantville
Byers, William E	Third	Loudonville
Calderwood, Charles Barton	Second	Columbus
Calkins, Frank Elwood	Third	Grand Rapids
Calvin, Anthony B	Third	Youngstown
Carey, John T	Second	Upper Sandusky
Cary, Charles Ross	Third	Millersburg
Clark, Lawrence Hayes	First	Cumberland
Clark, William Whittier	First	Canton
Clum, Harry Ernest	Second	Thornville
Cockerill, Orville Porter	First	Washington C. H.
Courtright, Thurman Thomas	Third	Greencastle
Crawford, William Harry	Third	Massillon
Croll, Alfred Jacobs	Third	Tontogany
Crout, Ray Durand	First	Columbus
Cullen, William Barnes	First	Hamilton
Curran, Bernard Franklin	Second	Corning
Damon, Owen H	Special	Hinckley
Darby, Roscoe Bryant	Third	Wauseon
Dawson, Nathan Charles	Second	Columbus
Determan, Hugo Philip	First	Columbus
De Witt, Claude Bennett	Third	Sandusky

	Year	Home Address
Donley, Russell Lee	Third	West Bedford
Doud, Harry L.	Second	Norwalk
Downing, Earl Summerville	Second	Middleport
Du Bois, Aaron Smock	Third	Franklin
Duff, Alfred L.	Second	Port Clinton
Dunlap, Carl Reed	Second	Columbus
Eagleson, Joseph Pentecost	First	Columbus
Euans, William Weldon	First	Columbus
Evans, Thomas Daniel	First	Newark
Feibel, Louis	Second	Hillsboro
Fippin, Elmer Otterbein	First	Galloway
Frankenberg, Don Juan	Second	Tempe, Arizona
Foster, George Gruel	First	Columbus
Friedlich, Alfred	Third	Troy
Galloway, Arthur Clyde	Second	Columbus
Gardner, Howard Julius	First	Kent
Graven, D. Homer	Third	Nashville
Haberer, Harry Andrew	Second	Dayton
Hahn, Howard Edward	Third	Coshocton
Hammond, Frank Nathan	Second	Smithfield
Hammond, Frederic Mathas	Second	Smithfield
Hancock, Winfield Scott	Third	Marietta
Harper, Ellahue Ansile	Third	Columbus
Harris, Claudius Earl	First	Martinsville
Hershey, Harry Hartman	Third	East Greenville
Hertlein, John F.	Third	Sandusky
Hite, William A.	First	Thornville
Hornbeck, Ross Garfield	First	London
Houss, Eugene Augustus	First	Wapakoneta
Howells, George A.	Third	Massillon
Hummell, Edwin Ray	First	Carroll
Jacobs, Horace K.	Third	Waynesville
Jahn, Nan	Third	Columbus
Johnson, Charles Foster	First	New Albany
Jones, Abbe Linhart	Second	South Zanesville
Jones, David Thomas	First	Youngstown
Jones, Hanby Raymond	Second	Westerville
Jones, Victor Waite	First	Columbus
Judge, James	First	Columbus
Keating, David Thatcher	First	Columbus
Keith, Donald Roscoe	First	Spencerville
Kellison, Edward Lafayette	Third	Quincy
Kennard, Oron Ellsworth	First	Chester Hill
Kinzel, Harry Gilbert	Second	Eagleport
Kistler, Charles Edward	First	Carroll
Kistler, Jonathan Aaron	First	Carroll
Lane, Quinton R.	Third	Canal Winchester
Lash, Henry Lloyd	Second	Bolivar
Laybourne, Lawrence E.	First	Springfield
Layne, Andrew J.	Second	Ironton
Leonard, Ralph Sherman	First	Granville
Lloyd, Erastus Guy	Second	Westerville
Long, Albert Taylor	First	West Carrollton

	Year	Home Address
Loup, Thomas M.	Third	Steubenville
Lynch, John Woods	Second	Greenville
Mallow, Lewis Earl	Second	Washington C. H.
Marquis, Fred Samuel	Third	Mansfield
Mattison, George C.	Second	Wauseon
Meier, William Henry	Third	Mt. Carmel
Melick, Neal A.	Special	Columbus
Minshall, Thaddeus Ellis	Second	Chillicothe
Minshall, William Edwin	Third	Coshocton
Moore, Henry Curtis	Third	Bainbridge
Morgan, Lewis W.	Third	Gibsonburg
Morris, Ingle Alman	Third	Columbus
Murphy, Frank Hayes	Second	New Comerstown
McCleary, Clayton Asa	Third	Science Hill
McClure, Robert Edward	Third	Dayton
McCray, Thomas Yates	Third	Mansfield
McCulloch, Roscoe Conkling	First	Millersburg
McGarry, James F.	First	East Liverpool
Nesbitt, David M.	First	Bellaire
Nevin, Lurton K.	First	Dayton
Nicholas, Edward Mithoff	First	Columbus
Nicholas, William Renfrew	Second	Columbus
Nicola, Benjamin Di	Third	Barnhill
Norpell, Ralph	Second	Newark
Peck, Foreman Jacob	Third	Clarksburg
Pence, William D.	Second	Columbus
Plagman, Lester W.	First	Fremont
Polk, Winfred Whittington	Third	New Vienna
Poole, Loren Winfield	First	De Graff
Pratt, Fred Kellogg	Special	New Philadelphia
Price, Jonathan A.	Second	Chili
Ramsey, Russell Kenney	Second	Columbus
Ranney, Jesse Fred	First	Columbus
Reed, Bert	Second	Piqua
Rightmire, George Washington	Second	Wheelersburg
Roebuck, Carl Fletcher	First	Dalton
Royon, Joseph Charles	First	Houston
Ryland, Paul Dillen	Special	Columbus
Sackett, Carl Leroy	Second	Big Horn City, [Wy.
Sampson, John Henry	First	Columbus
Scarlett, Henry Launcelot	First	Columbus
Schantz, Edwin Michael	First	Zimmerman
Schoedinger, Frederick H.	First	Columbus
Schwenck, William Jennings	Third	Kenton
Shaw, John William	Second	Troy
Sheetenhelm, Curtis Cicero	First	Columbus
Sheetz, George W.	First	New Washington
Shepherd, Charles William	Special	Huron
Shepherd, George Harvey	Second	Dayton
Shoemaker, William Allen	First	Zanesville
Shotwell, Franklin Albert	First	Marengo
Sigrist, Charles Ferdinand	Special	Congress
Skiles, Roscoe Carleton	Second	Shelby

	Year	Home Address
Smith, Wellington Cornell	Second	Lytle
Snow, Mason J	First	Columbus
Southworth, Ferdinand Leek	Third	Alliance
Sparks, Homer H	First	Columbus
Sprague, William Ralph	Second	Columbus
Springer, Nevada Weston	First	Columbus
Spurrier, Emery Allen	First	Chester Hill
Steinemann, George Charles	First	Minster
Sterrett, Frank Marion	First	Troy
Stevenson, Amos Claude	Third	Fostoria
Stewart, Gabrielle Townshend	Third	Cleveland
Stoolfire, Henri Stanton	Third	Columbus
Strader, Maynard	First	Zuber
Tangemann, Theodore H	Second	Ketterville
Tanner, John Robert	Third	Mt. Sterling
Taylor, Everett Buren	First	New Albany
Taylor, Frank Stewart	First	Alliance
Terwilliger, Meeker	Second	Circleville
Thomas, Herbert Spencer	First	Wheeling, W.Va.
Tipton, Robert	First	Milo
Toland, Harford Aquilla	Third	Columbus
Turner, Edward C	Second	Columbus
Veneman, Nevin Edward	First	Dayton
Voegele, William Frederick, Jr	Third	Mansfield
Wakefield, George W	Second	Reynoldsburg
Walker, Mary Ray	First	Dayton
Warden, Hosea Gilford	Second	Columbus
Wertz, Edward Sleeser	Third	Dalton
West, Frederick Rollin	Second	Columbus
Westwater, James Gulick	First	Columbus
Wharton, Homer Franklin	Second	Washington
Wheeler, Newberry William, Jr	Second	Portland
Williams, John William	Second	Roseville
Williams, Lloyd Thomas	Third	Jackson
Williamson, Allen Thurman	Second	Grandview
Wilmot, Charles Austin	Third	Claridon
Wilson, Frank	Third	Jolly
Wilson, Lewis Ernest	First	Columbus
Wise, Charles Clifton	First	Millersburg
Wolf, Edward Christofer	First	Circleville
Woods, Charles Howard	Third	Chillicothe
Worcester, Wood Frank	First	Columbus
Worman, Horace Dye	Second	Dayton
Wulff, August R	Second	Dayton
Yockey, Paul B	Third	Columbus
Young, Samuel N	Third	Lima

COLLEGE OF PHARMACY

UNDERGRADUATES — 39

	Course	Course Hours	Credit Hours	Home Address
*Ashinger, William E.	Long	208½	...	Uphur
Barrick, Alfred Ashberry	Special	...	144	Columbus
Block, Arthur William	Short	112	49	Galion
Bodman, Edgar Sereno	Long	208½	49½	Bement, Ill.
*Bowen, Charles Flood	Long	206	171+24	Columbus
Briggs, Claude Nicholas	Short	112	...	Briggsdale
Canfield, Delos Wilford	Short	112	105+26	Chardon
Cassady, Clyde Brint	Short	112	69	Alliance
Crosson, Stanley Berry	Short	112	40	Blanchester
Day, Levi Wille	Short	112	...	Mt. Oreb
*Funk, Roy William	Long	206	137+12	Chesterhill
Gardner, Charles Alfred	Short	112	107	Danville
Haudenschild, Harry J.	Short	112	43+6	Loudonville
Harvey, Lucy Manola	Short	112	107+60	Pomeroy
Hollingsworth, Clyde Evans	Short	112	37	Mt. Gilead
Hoover, Walter Emmett	Short	112	67	Ashville
Horst, Herman Henry	Short	112	28	Marysville
Hurst, Grace	Short	112	...	Piketon
*Keller, Charles Franklin	Short	112	38	Arcanum
Kerr, Franklin Pierce, Jr.	Special	...	110+19	Columbus
Kimberly, Charles Hubbell, B. Sc.	.....	...	...	N. Fairfield
Knowlton, Fred A.	Short	112	57	Granville
Krebs, Otto	Short	112	48	Cleveland
Lefferson, Charles Henry	Short	112	36+10	Middleton
Morris, Harry Long	Special	...	161	Springfield
*Naddy, Charles Joseph	Long	206	114	Columbus
Oglesby, Nicholas Perkins	Short	112	102+6	Lucretia, Va.
Phillips, James McIlvaine	Special	...	3	Columbus
Pope, Harry Bentley	Short	112	53	E. Liverpool
Roush, Katherine Layzelle	Short	112	10	Syracuse
Sherman, James Garfield	Short	112	38+12	Columbus
Snyder, Roy Bernard	Short	112	43	London
Squire, Clarence W.	Short	112	73	Ashville
Stoelzel, Julius Frederick	Short	112	15	Loudonville
Tracy, John Baptist	Short	112	68	Circleville
Wagstaff, Harry Garfield	Special	...	112	Niles
Ware, George H.	Short	112	20	Dayton
Webb, Edward Nathan	Long	206	113	Rome
Young, Cyrus Homer	Long	206	118	Wooster

* Preparatory work incomplete.

COLLEGE OF VETERINARY MEDICINE

GRADUATE STUDENTS—5

	Home Address
Clawson, Clarence Alfred, B. Sc. (Agr.)	Okena
Hanawalt, David Christopher, V. S. (Ontario)	Greenfield
Hart, Arthur Clark, V. S. (Ontario)	West Richfield
Imes, Marion, B. Sc. (Agr.)	Bashan
Murray, Frank Erskine, D. V. M.	Greenfield

UNDERGRADUATES—17

		Course Hours	Credit Hours	Home Address
*Auer, Curtiss		172	18	Lewisville
Brown, Harry Wilbur		172	54	Columbus
Eddy, William D. V. M.		...	...	East Cleveland
*Forrester, Harry Arthur		172	54	Reynoldsburg
*Griffin, Frank		177	165	Columbus
Hammond, Harry James, D. V. M.		...	...	Sharon
*Henderson, Charles Logan		172	54	Crescent
*Irwin, Albert N		177	112	Columbus
*Johnson, Theodore Charlemagne		177	106	Akron
*Lamb, Morgan Baxter		172	34	Barlow
*Metzger, Edward Louis		177	108	Louisville
Morrow, Charles James, D. V. M.		...	...	Tiro
*McClelland, Robert Lyle		172	66	Andover
*Pettiford, Oscar Collins		172	54	Wauseon
*Sater, Clinton Huron		172	54	Sater
*Severn, Warren		172	54	Cuba, N. Y.
Worcester, Warner	Special	...	186	Columbus

* Preparatory work incomplete.

GENERAL SUMMARY

College of Agriculture and Domestic Science—		
Graduate Students	4	
Undergraduates	153	
		157
College of Arts, Philosophy and Science—		
Graduate Students	25	
Undergraduates	419	
		444
College of Engineering—		
Graduate Students	11	
Undergraduates	394	
		405
College of Law—		201
College of Pharmacy—		39
College of Veterinary Medicine—		
Graduate Students	5	
Undergraduates	17	
		22
Total		1,286
Names counted twice		16
Net total		1,252

SUMMARY BY COUNTIES

Adams	1	Guernsey	4	Morrow	6
Allen	5	Hamilton	13	Muskingum	18
Ashland	9	Hancock	3	Ottawa	3
Ashtabula	11	Hardin	3	Paulding	1
Athens	3	Harrison	5	Perry	13
Auglaize	10	Henry	5	Pickaway	14
Belmont	9	Highland	4	Pike	2
Brown	2	Hocking	3	Portage	8
Butler	14	Holmes	5	Preble	10
Carroll	3	Huron	9	Putnam	4
Champaign	14	Jackson	11	Richland	10
Clark	10	Jefferson	9	Ross	24
Clermont	12	Knox	17	Sandusky	4
Clinton	8	Lake	3	Scioto	6
Columbiana	16	Lawrence	6	Seneca	10
Coshocton	13	Licking	22	Shelby	3
Crawford	5	Logan	10	Stark	22
Cuyahoga	15	Lorain	8	Summit	9
Darke	6	Lucas	6	Trumbull	6
Defiance	1	Madison	17	Tuscarawas	12
Delaware	6	Mahoning	9	Union	12
Erie	16	Marion	6	Vinton	3
Fairfield	20	Medina	9	Van Wert	2
Fayette	14	Meigs	11	Warren	7
*Franklin	423	Mercer	2	Washington	5
Fulton	9	Miami	16	Wayne	11
Gallia	8	Monroe	2	Williams	5
Geauga	6	Montgomery	39	Wood	7
Greene	9	Morgan	11	Wyandot	2

SUMMARY BY STATES AND COUNTRIES

(As far as known)

Alamaba	1	Iowa	1	Ontario	1
Colorado	2	Kentucky	2	Oregon	1
Cuba	1	Michigan	5	Pennsylvania	6
Georgia	1	Missouri	1	Virginia	3
Germany	1	New Jersey	1	Washington, D. C.	2
Illinois	9	New York	6	West Virginia	7
Indiana	2	Ohio	1197	Wyoming	2

*Nearly forty-two per cent. of the students registered from Franklin county are those whose homes are at Columbus only during their University course.

GRADUATES

GRADUATES

The faculty of the Ohio State University are anxious to place a copy of each annual catalogue in the hands of every graduate. They will esteem it a favor of any alumnus who changes his residence will notify the Executive office of his new address and occupation. They will also be grateful for any information from any source, that may assist in making or keeping the Directory of the Alumni complete and correct.

ALUMNI ASSOCIATION

OFFICERS FOR 1900–1901

MRS. ANNIE W. SIEBERT, '84, Columbus.....*President*
FRANK RAY, '87, Columbus.....*Vice-President*
LOWRY, F. SATER, '95, Columbus.....*Secretary*
MIRON A. SMITH, '92, Columbus.....*Treasurer*
G. GLEN ATKINS, '88, Greenfield, Mass.....*Orator*

COMMITTEE ON COLLEGE AFFAIRS

FLORIZEL SMITH, '80, Columbus.....Term expires 1901
MRS. HARRY I. ABBOTT, '93, Columbus..... " 1902
LORING HAPGOOD GODDARD, '92, Manora, Ohio..... " 1903
KARL T. WEBER, '97, Columbus..... " 1904
BERTHOLD A. EISENLOHR, '98, Corning..... " 1905

COMMITTEE ON NECROLOGY

LOWRY F. SATER, '95, Columbus.....Term expires 1901
DAISY M. SCOTT, '87, Columbus..... " 1902
EDWARD J. CONVERSE, '86, Columbus..... " 1903

DIRECTORY

A

Abbott, Arthur Grant, 1899, B. Sc. (Agr.), Medina.
Abbott, Royal A., 1900, B. Ph., Columbus.
Ackerman, Eli Osborn, 1884, C. E., 2664 North High street, Columbus, Columbus Street Railway Co.
Ackerman, Fremont, 1883, C. E., Los Angeles, Cal., civil engineer.
Addison, Arthur Everett, 1895, B. Ph., 1900, LL. B., Columbus, teacher East High School.
Addison, Louis Granville, 1892, LL. B., Columbus, attorney-at-law.
Addison, Clarence Maywood, 1896, B. Ph., 1900, LL. B., Columbus, teacher Central High School.
Agler, Eulalia, 1895, G. Ph., Columbus, with Columbus Pharmacal Company.
Albert, Louisa Mary, 1895, B. A. (Ohio Wesleyan University), 1896, G. Ph., Mrs. A. E. Vinson, Columbus.
Aldrich, Chester H., 1888, B. A., LL. B., David City, Neb., attorney-at-law.
Aldrich, Edgar S., 1897, M. E. in EE., Proprietor and Manager Electric Light Plant, Waynetown, Ohio.
Alexander, St. Clair, 1893, M. E. in EE., Bridgeport.
Alexander, Charles P., 1896, M. E. in EE., Canton, O., District Manager Northwestern Mutual Life Insurance Company.
Allaman, William Ernest, 1896, G. Ph., Columbus, Student O. M. U.
Allen, Edward Harrison, B. A. (Ohio Wesleyan University), 1899, LL. B., Lena.
Allen, Lucy, 1897, B. A., 1900, M. A., Columbus, library assistant, State University.
Alsdorf, Percy Reed, E. M., Central City, Col., Standard Assay office.
Alsdorf, Frederick Charles, 1892, E. M., Central City., Col., Superintendent Mt. Wilson Gold and Silver Mining Co.
Alspach, Rufus Edwin, 1897, M. A. (B. A. Heidelberg), Thornville.
Anderson, James T., 1884, B. A., Colorado Springs, Col., 1st Lieutenant U. S. Army.
Anderson, Newton M., 1879, B. Sc., Cleveland, Principal of the University School.
Andress, Edna A., 1900, B. Ph. (Mrs. Julius Stone) Columbus.
Andrews, Albion Joseph, Jr., 1893, LL. B. (B. S., Ohio Wesleyan University), Zanesville.
Andrews, Lincoln Elmer, 1893, LL. B., 1895, B. Ph., Columbus, attorney-at-law.
Armstrong, Edna, 1897, B. Ph., Columbus.
Armstrong, William H., 1890, G. Ph., Marysville, druggist.
Arnold, Charles Lincoln, 1890, B. Sc., 1894, M. Sc., West Eighth ave., Columbus, assistant professor in mathematics, State University.
Arnold, Edwin E., 1898, M. E., Westinghouse Machine Co., Pittsburg, Pa.
Atkins, G. Glenn, 1898, B. A., Greenfield, Mass., pastor Congregational Church
Atkinson, Warren, 1899, M. E., Tester of steam pumping engines at works of H. R. Worthington, Brooklyn, N. Y.
Auld, James A., 1897, M. E. in EE., Columbus, with D. S. Auld, 76 East Gay street.
Austin, John Gustave, 1899, LL. B., Sparta.

B

Bachtell, Nellie May, 1895, B. A., New London, teacher.
Backhaus, Henry Ward, 1894, B. A., Wapakoneta, cashier People's National Bank.
Baer, Philip, Jr., 1897, B. Sc. (Agr.), Canal Dover, Dairy Farmer.
Bagley, Anna Gertrude, 1894, G. Ph., Columbus, with Hallwood Cash Register Company.
Baker, James Burt, 1898, LL. B., Salem.
Baker, John Ezra, 1897, B. A., 1898, LL. B., St. Paris.
Baker, William Hollister, 1892, B. Agr., Hazelhurst, Mo., farmer and stock raiser.
Baldwin, Elizabeth Grant, 1899, B. Ph., Columbus.
Baldwin, Zoa Belle, 1896, B. A., Neil Av. Columbus.
Ball, Emma Leanna, 1895, B. Sc., 1896, M. Sc., Columbus.
Ball, Fred S., 1888, B. Ph., Montgomery, Ala., attorney-at-law.
Bancroft, Gay, 1898, B. A., Columbus, 26 West Gay street.
Barcus, Eliza D., 1900, B. A., Columbus.
Barcus, Miner, 1897, M. E., in EE., Schenectady, N. Y., with General Electric Company.
Barlow, Helen M., 1898, B. Ph., Columbus.
Barnaby, Charles L., 1898, C. E., 37 South Ninth street, assistant on Engineer Corps, Cincinnati Division, P. C. C. & St. L. Ry.
Barnaby, Josephine, 1896, B. Ph., Warren, teacher.
Barrows, Harry Holbrooke, 1898, C. E., Lexington, Ky., resident engineer Cincinnati Southwestern R'y.
*Bartholomew, Clyde Stanley, 1896, C. E., died June 23rd, 1900.
Basterdes, Ada Mabel, 1890, B. Ph., Plano, Ill., teacher in High School.
*Bates, Josephine M., 1381, B. Ph., Mrs. Florizel Smith, died ——, 1900.
Bates, Wesley, C., 1882, LL. B., 35½ N. High street, Columbus, Attorney.
Baughman, George W., 1897, G. Ph., Springfield, Pharmacist.
Beach, David Price, 1895, C. E., Wellsville, in employ of Pennsylvania Railroad.
Beach, Margaret Alice, 1891, B. Ph., Mrs. Wilson Holman, Bayonne, N. J.
Beardsley, Orsamus D., 1898, B. Ph., Garrettsville.
Beattie, William Renick, 1894, B. Sc., 1897, M. Sc. (in Horticulture), Washington, D. C., U. S. Department of Agriculture.
Beck, Arthur Andrew, 1893, C. E., Columbus, county surveyor's office.
Belden, Sanford Bonner, 1895, E. M., Manager Pittsburg Office Jeffrey Manufacturing Company.
Bell, Florence Louise, 1900, B. Ph., Columbus, 382 East Town street.
Bell, Mary Edith, 1894, B. Ph., teacher in Central High School, Columbus.
Bennet, Henry C., 1890, B. A., 100 Washington street, Chicago, Ill, Attorney-at-law.
Bennett, Samuel E., 1890, D. V. M., Kansas City, Mo., Government Meat Inspector.
Bently, William Preston, 1885, B. Agr. (B. A. 1890, M. A. 1893, Bethany College) 15 Miller Road, Shanghai, China, missionary.
Bertsch, Joseph Franz, 1896, LL. B., Columbus, 124 West Ninth avenue.
Bibbee, George E., 1897, LL. B. (A. B. Ohio Wesleyan University), Columbus, 41 King avenue.
Biebel, Herman Matthews, 1896, M. E. in EE., Chicago, Ill., electrical engineer with Western Electric Co.
Bischoff, John Wallace, 1899, E. M., Thomas, W. Va., assistant engineer Davis Coal and Coke Co.

Bissing, William, 1893, M. E. in EE. (A. B. Johns Hopkins University), examiner in U. S. patent office, Baltimore, Md.
Blackburn, Frank H., 1896, M. E. in EE., Fostoria, Electric Engineer, Fostoria Incandescent Lamp Co.
Blaire, Edward Grey, 1895, G. Ph., Shawnee, pharmacist.
Blakiston, Anna Houston, 1897, B. Ph., Mrs. Powell.
Blakiston, Mary, 1893, B. Ph., Columbus, teacher in East High School.
Blinn, Ray S., 1893, B. S.
*Bloom, Edwin M., 1893, B. Sc., died, 1894.
Bloom, J. George, 1889, C. E., Chillicothe, division engineer B. & O. S. W. Ry..
Bloomfield, Lloyd Morris, 1891, B. Agr., Central America.
Bock, Harrison W., 1898, LL. B., 1899, B. Ph., Canton.
Bockius, Harry Graham, Ph. B. (Yale University), 1899, LL. B., Canton.
Bodman, Mary E., 1898, B. Ph., Bement, Ill.
Boesche, Felix John, 1896, G. Ph., Denver, Col.
Boesel, Frank Tilden, 1896, B. Ph., student, Harvard Law School.
Bogue, Ernest Everett, 1894, B. Sc. H. & F., 1896, M. Sc., Professor of Botany and Horticulture, Agricultural and Mechanical College, Stillwater, Okla.
Bohn, Frank A., 1900, B. Ph., Olmsted Falls.
Bohn, William Edward, B. A. (German Wallace College), 1900, M. A., Olmsted Falls.
Bond, Charles Grosvenor, 1899, LL. B., Columbus, 595 Oak street.
Bone, John H., 1893, B. Sc., 1896, B. Sc. (Agr.), New Richmond, Ind.
Booth, Lucy Adelaide, 1892, M. A. (B. A., Ohio Wesleyan University), 1894, Ph. D., Columbus.
Bope, George W., 1897, LL. B., Columbus, third assistant director of law, 275 East State street.
Bostwick, Homer Z., 1900, B. A., Columbus, Student O. S. U. Law School.
Bowden, Harry W., 1900., C. E., Minerva.
Bower, Jerome G., 1897, M. E., 295 North High, Columbus.
Bownocker, John A., 1889, B. Sc., 1897, D. Sc., Columbus, associate professor of Inorganic Geology, State University.
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Boyd, James G., 1897, D. V. M. Columbus.
Boyd, Martin L., 1897, LL. B., Columbus, 265 East Eleventh Ave.
Bradford, Ernst, 1892, G. Ph., Columbus, chemist, with N. W. Lord, O. S. U.
Bradford, Joseph Nelson, 1883, M. E., 54 West Tenth Ave., Columbus, associate professor of drawing, State University.
Brand, Harry Frank, 1896, B. Ph., 1897, LL. B., Worthington.
Brandt, James Herbert, 1899, B. A., Greencastle.
Brandt, Ulysses Sherman, 1895, B. A., Canal Winchester.
Braun, Joseph G., 1897, G. Ph., Columbus, 802 South Champion avenue, Pharmacist.
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Brewer, Charles Reed, LL. B., Bowling Green.
Brewer, John Whitney, 1896, G. Ph., Columbus, 126 West Tompkins street, Pharmacist.
Bright, Frederick I., 1900., LL. B., Logan.
Britton, John Carr, 1898, B. Sc. (Agr.), Buffalo, N. Y.
Brier, Harvey E., 1890, D. V. M., Tippecanoe City, veterinary surgeon.

Bronson, Herman S., 1897, LL. B. (B. L., Cornell University), Columbus, Attorney, 120 Wilson avenue.
Brophy, James Francis, 1899, E. M., Sun, W. Va., Sun Coal and Coke Co.
Brown, Frank, 1899, M. A. (A. B., Macalester College), Columbus, teacher in High School.
Brown, Frederick W., 1888, E. M., Superintendent of Colorado Portland Cement Co., Florence, Colorado.
Brown, Newton H., 1893, M. E. in EE., Newark, Del., professor of Electrical Engineering, Delaware College.
Bruce, Charles A., 1895, B. A., Columbus, assistant professor of Romance Languages, State University.
Brumley, David, 1895, C. E., Louisville, Ky., with L. & N. Ry.
Bruning, Henry Dietrick, 1896, C. E. Pittsburg, Pa., engineer on P., C., C. & St. L. R. R.
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Buckman, Arthur Leslie, 1897, M. E., in EE., Central Union Telephone Co., Toledo.
Buckman, Ola., 1895, B Sc. (M. D., Cleveland University of Medicine and Surgery), Norwalk.
Bunnell, Larone A., 1898, G. Ph., Dayton, Pharmacist.
Burgess, James Henry, 1900, B. Ph., Big Horn, Wy.
Burkett, Charles William, 1895, B. Sc. (Agr.), 1898, M. Sc. (Agr.), Durham, N. H., professor of Agriculture, New Hampshire State College.
Burkett, Dora Van Buren, 1897, B. Ph., Columbus.
Burns, James Ferguson, 1891, C. E., Hopkinsville, Ky., assistant engineer L. & N. Ry.
Burr, Harriett G., 1897, B. A., Worthington.
Butler, James Marion, 1894, LL. B. (A. B., Ohio Wesleyan University), Carmel.
Butterworth, William H., 1898, B. A., Columbus, 45 North Seventeenth street.
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Callender, Sherman D., Ph. B. (Oberlin College), 1898, LL. B., 326–330, The Nasby, Toledo, Attorney.
Calvin, Anthony B. (A. B. Northeastern Ohio Normal), 1900, LL. B., Youngstown.
Canfield, Charles H., 1897, D. V. M., Government Meat Inspector. Kansas City, Mo.
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Canfield, Leander Randall, 1896, B. Ph., Chardon.
Capron, Marshall Fremont, 1888, M. E., architect, Cleveland.
Carr, Hugh Stanley, 1896, M. E. in EE., assistant professor Electrical Engineer, Lawrence, Kansas.
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Carroll, Patrick Henry, 1894, E. M., Herrin, Illinois, Supt. Big Muddy Coal and Iron Co.

Carroll, William Hunt, 1894, LL. B., Wilmington.
Carson, Samuel King, 1895, M. E. in EE., M. D. (Ohio Medical University), Acting Assistant Surgeon U. S. A., Manila, P. I.
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Catlin, Homer Clark, 1896, C. E., Bridge Department, N. Y. C. R. R., Grand Central Station, N. Y.
Canaga, George Orlando, 1895, LL. B. (B. A., Scio College).
Cartwright, Henry Gilroy, 1895, LL. B.
Cavanaugh, Andrew F., 1900, M. E., Dayton.
Cellarius, Frederick Julius, 1888, C. E., Dayton, civil engineer.
Chamberlain, Helena W., 1884, B. A., Mrs. Ellis Lovejoy, Union Furnace.
Chalmers, Agnes Florida, 1895, B. Ph., Bay City, Mich., teacher in High School.
Chappell, Walter Evans, 1898, M. E. in EE., first-class electrician, U. S. S. *Chicago*, care U. S. Despatch Agent, New York.
Charters, William Filson, 1887, B. Ph., Sidney, tax inquisitor.
Cherryholmes, W. K., 1881, B. Sc., M. D., Hamilton, physician.
Cilley, Raymond, 1896, C. E.
Clark, Alexander B., A. B. (Yale University), 1899, LL. B., Canton.
Clark, Clarence J., 1899, C. E.
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Clay, Albert Arlington, 1893, LL. B. (B. A., Tri-State Normal College), Hicksville.
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Connor, Ellen J., 1900., B. Ph., Columbus.
Converse, Edward Jasper, 1886, B. A. (B. D., Yale University), Columbus, assistant pastor, First Congregational Church, 808 North High street.
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Converse, Walter, 1899, B. A., Plain City.
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Cope, Albert N., 1897, M. E. in EE., Columbus, foreman Columbus Street R. R.
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Craig, Moses, 1889, B. Sc. (M. S., Cornell University, 1890), 1896, M. Sc. (H. F.), Auburn, Ala., assistant in Horticulture Experiment Station.
Cratty, John Mason, 1897, B. Sc., Cincinnati, chemist.
Crawford, Ira, Jr., 1893, LL. B. (B. S., Denison University), Dayton.
Crawford, William Sterling, 1888, B. Ph.
Croll, Alfred J. (A. B., Ohio Normal University), 1900, LL. B., Tontogany.
Cromley, Alva M., 1897, G. Ph., pharmacist, Circleville.
Crooks, Charles Melvis, 1892, B. A. (D. D., Harvard University, 1896), Colerain, Mass., pastor Congregational church.
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Cunningham, John Ferguson, 1897, B. Sc. (H. & F.), 1899, M. Sc. (H. & F.), Cleveland, assistant editor "Ohio Farmer."
Curtis, Leigh Goodrich, 1899, C. E., Zanesville, Dept. M. of U., B. & O. R. R.

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Daily, Henry G., 1892, D. V. M., Wooster, veterinary surgeon.
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Davis, Charles William, 1894, E. M., Colorado Springs, Col., care J. Mck. Terriday & Co.
Davis, Oscar Allen, 1897, M. E. in EE., Alliance, draughtsman Morgan Engineering Co.
Davis, Vernon Hays, 1900, B. Sc. (Agr.), Byesville.
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Deardurff, Carl Mason, 1895, B. A.
DeLamater, Clayton William, 1884, A. B., LL. B., Omaha, Neb., attorney-at-law.
DeLoffre, Andre, 1896, M. E. in EE., Schenectady, N. Y., Engineering Department General Electric Co.
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Dice, Jesse Peck, 1898, LL. B., Akron.
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Dill, Dille Augusta, 1900, B. Ph., Columbus.
Doan, Frank C., 1898, B. Ph., Athens, professor of philosophy, Ohio University.
Dollison, Harvey C., 1900, B. Sc., Columbus.
Doney, Carl Gregg, 1891, B. Sc., 1893, LL. B., Delaware, pastor M. E. Church.
Donham, Maurice, 1896, M. E., Struthers, Wells & Co., Warren, Pa.
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Dowd, Charles F., 1900, B. Ph., Toledo.
Dresbach, Melvin, 1897, B. Sc., Columbus, Fellow in Physiology, State University.
Drummond, William G., 1900 M. E., Cleveland.
Dubois, Wilbur L., 1900, B. Sc., Columbus, Fellow in Chemistry, State University.
Dun, George William, 1884, B. Sc., Columbus, business manager "Columbus Citizen."
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Dunlap, Robert R., 1900, M. E. in EE., Columbus.
Dunnick, Edward, 1897, C. E., Mt. Vernon Bridge Co., Mt. Vernon, O.
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Early, Franklin E., 1893, D. V. M.
Easterday, Charles Todd, 1891, G. Ph., Wellston, Druggist.
Eddy, William, 1900, D. V. M., Cleveland.
Edwards, Mary Winifreda, 1897, B. A., New Richmond, Prin. of High School.
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Emery, Peyton Randolph, 1893, LL. B., London.
Emery, Vernon Judson, 1887, B. A. (A. M., University of Nebraska), Cleveland. assistant professor of Latin, Western Reserve University.

Erf, Oscar, 1899, B. Sc. (Agr.), Champaign, Ill., Instructor in Dairying, University of Illinois.
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Evans, William Lloyd, 1892, B. Sc., 1896, M. Sc., Colorado Springs, Col., teacher of chemistry in High School.
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Fairchild, Harmon Scott, 1894, LL. B., Springfield.
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Fassig, Oliver L., 1882, B. Sc., Baltimore, Md., instructor in Climatology, Johns Hopkins University.
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Fay, Mona, 1897, B. Ph. (Mrs. Eugene Gee), Wheeling, W. Va.
Feicht, Russell Stimson, 1890, M. E. in EE., Engineering Department Westinghouse E. & M. Co., Pittsburg, Pa
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Fergus, Guy Carlton, 1898, M. E. in EE., partner in Zanesville Electrical Co.
Fergus, John Franklin, 1892, LL. B., Columbus, attorney-at-law.
Fickes, Walter M., 1900, E. M. (Ceramics) Steubenville.
Finley, Harry Marshall, 1894, B. A., McConnelsville, principal of High School.
Fippin, Elmer Otterbein, 1900, B. Sc. (Agr.) Briggsdale.
Fischer, Paul, 1891, B. Agr., D. V. M., professor of Veterinary Medicine, Manhatten, Kas.
Fischer, Robert, 1895, G. Ph., 1896, M. Ph., 1898, B. Sc., Ithaca, N. Y., laboratory assistant, Cornell University.
Fischer, Walter, 1897, B. Sc., Columbus, 810 Franklin avenue.
Fish, Fred Alan, 1898, M. E. in EE., Columbus.
Fisher, Clara, 1886, B. A., Mrs. J. Porter Milligan, Columbus.
Fisher, Georgietta, 1895, B. A., teacher in High School, Ottumwa, Iowa.
Fisher, Ida May, 1900, B. Ph., Columbus.
Fitzgibbon,, James Robert, 1894, LL. B., Newark.
Fitterer, John Conrad, 1898, B. Sc., Butler.
Flickinger, George A., 1898, B. Sc., (Agr.), Knoxville, Tenn., Dairyman at University of Tennessee.
Floto, Julius, 1889, E. M., Chicago, Ill., Monadnock Building, with C. L. Strabel.
Flynn, Benjamin H., 1898, C. E., Columbus, with State Board of Health.
Flynn, Harry Franklin, 1892, C. E., Washington, D. C., U. S. Geodetic and Coast Survey.
Flynn, Maud, 1896, B. Sc., Columbus, student, Columbus Normal School, 40 East Fifth avenue.
Flynn, Oscar Rodgers, 1896, B. Sc., teacher in High School, Columbus.
Foley, William J., 1894, D. V. M., Lexington, Ky.
Ford, Ruth L., 1898, B. A., Ashtabula, teacher in High School.
Ford, Stanley Hamer, 1898, B. Ph., 1st Lieut. in U. S. Army.
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Foster, Dudley Hampton, 1895, B. Ph., LL. B., attorney-at-law, Corning.
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Fox, Charles P., 1890, B. Agr., 1895, M. Agr., Columbus.
Fox, Frederick Hugh, 1896, B. Ph., McConnelsville.
Fox, John Herbert, 1897, M. E., Cleveland, Brown Hoisting Machine Co.
Fox, Ross G., 1900, B. Ph., Columbus.
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Fullerton, Charles Haywood, 1898, B. Ph., Wheelersburg.

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Grate, Charles Artemis, 1898, M. E.
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Gray, Genevieve, 1898, B. Ph., Columbus.
Gray, James Collam, 1892, LL. B., 1893, LL. M., Pittsburg, Pa., attorney P. R. Ry.
Graven, D. Homer (A. B., Ohio Normal University), 1900, LL. B., Nashville.
Green, Charles C., 1885, B. Sc., M. D., Beaver City, Neb., physician.
Green, Jerome Joseph, 1893, M. E. in EE., Notre Dame, Ind., Notre Dame University, professor of Physics and Elec. Engineering.
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Griffiths, Benjamin Lincoln, 1898, LL. B., Vaughnsville.
Grimsley, George Perry, 1890, B. A., 1891, M. A. (Ph. D., Johns Hopkins University, 1894), Topeka, Kan., professor Natural History, Washburn College.
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Groff, Warren Noble, 1896, B. A., 1899, LL. B., Tiffin.
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Gruen, Francis William, 1899, B. Ph., 1899, LL. B.
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Hammond, Bessie B., 1897, B. Ph., Columbus, 443 Mt. Vernon avenue.
Hammond, Harry J., 1900, D. V. M., Sharon Centre.
Hammond, Rose Lyttle, 1896, B. Ph., Columbus, teacher, 90 North Twenty-second street.
Hancock, Winfield Scott (A. B., Marietta), 1900, LL. B., Marietta.
Hancock, David R., 1889, G. Ph., M. D., Columbus, Physician.
Haney, Thomas Carlyle, 1894, G. Ph., Columbus, pharmacist, corner Schiller and Third streets.
Hannum, William Hamilton, 1897, B. A., India, missionary.
Harbage, Arnett, 1893, D. V. M., West Jefferson, farmer.
Harkins, Robert R., 1900, M. E. Columbus.
Harlor, John David, 1895, B. A., Columbus, teacher in Central High School.
Harper, Ellahue A. (B. A., Ohio Wesleyan University), 1900, LL. B., Columbus.
Harris, Charles Pearl, 1899, B. Ph., West Liberty.
Harris, Frank Laverne, 1894, LL. B. (Ph. B., Tri-State Normal University), Payne.
Harris, Walter Conger, 1893, B. Sc., New York, with Art Department of Herald, 104 West 114th St.
Harrison, Warner, 1892, LL. B., East Town street, Columbus, attorney and solicitor C., A. & C. Railway.
Harrison, William Henry, 1885, C. E., Butte, Montana, assistant engineer Butte City Water Works.
Harrold, Ernst Ellwood, 1895, G. Ph., dispenser chemical store-room, State University.
Harrop, Herbert Bailey, 1898, B. Sc., Columbus, 1323 Forsythe avenue.
Hartsough, William H., Jr., 1898, B. Ph., Columbus, 1356 Hunter avenue.
Hartwell, Arthur, 1888, M. E., Chicago, Ill., manager Chicago office Westinghouse E. & M. Co.
Hartwick, Louis M., 1897, M. E., Draftsman in Steel Works, Johnstown, Pa.
Harvey, Arlington Corylle, 1896, B. Ph., 1897, M. A., 1899, LL. B., Columbus, 145 King avenue.
Harvey, Emory Wayland, 1896, B. Ph., 11 East Sixteenth street, New York City, Milton Bradley Co.
Harvey, Florence Danford, 1898, B. Ph., Mt. Perry.
Harvey, Sherman Lee, 1896, G. Ph., Harrisburg, Druggist.
Harward, Arthur B., 1900, B. A., Columbus.
Hassler, Robert Hanich, 1892, M. E. in EE., electrical engineer, Indiana Bicycle Co., Indianapolis, Ind.
Hastings, Edwin George, 1898, B. Sc., Austinburg.
Hayes, Seth, 1892, B. Sc., Fremont, principal of High School.
Hayman, William C., 1900, M. E. in EE., Holgate.
Hayward, George E., 1893, C. E., New Philadelphia, surveyor of Tuscarawas county, Ohio.
Hazelton, Bird, 1898, B. Ph., New Straitsville.
Hazlett, Robert, Jr., 1887, C. E., Wheeling, W. Va., engineer for Ohio Company.
Heacock, William Preston, 1898, LL. B., Cardington.
Heath, Arthur T., 1887, G. Ph., Oak Harbor, analytic chemist, consulting engineer and contractor.
Hebble, Charles Roy, 1896, M. E. in EE., Cincinnati, electrical engineer.

Hedges, Harry, 1888, B. A.
Heller, Albert Henry, 1890, C. E., Youngstown, Youngstown Bridge Co.
Henderson, Adelbert Andrew, 1898, C. E., Columbus, City Engineer Corps.
Henretta, Charles Michael, 1896, E. M., Buffalo, engineer J. W. Ellsworth Coal Co.
Herbert, Charles T., 1897, LL. B., Columbia, South America.
Herms, Edith S., 1898, B. Ph., Portsmouth.
Herrick, Louise, 1893, B. A. (Mrs. Harry Abbott), Columbus, 1454 Highland St.
Hershey, Harry Hartman (A. B., Mt. Union College) 1900, LL. B., East Greenville.
Hertner, John H., 1899, M. E. in EE., Dayton.
Hess, Florence Louise, 1895, B. Ph., Columbus.
Hewitt, Strafford Reaves, 1898, M. E. in EE., Columbus Belting and Packing Co.
Hiatt, William Arthur, 1895, B. Ph., New York City, teacher in Stevens School, Hoboken, N. J.
Higbee, Charles E., 1883, B. Sc.
High, Odessa, 1896, B. A., West Jefferson.
Hill, Frank E., 1886, B. Sc., M. D., Muncie, Ind.
Hill, I. T. Reynolds, 1896, B. Sc. (H. & F.), Toledo, O., paymaster for Woolson Spice Co.
Hine, James S., 1893, B. Sc., Columbus, assistant professor of Entomology, State University.
Hine, Lucius A., 1888, E. M., 140 50th street, Chicago, Ill., President and Treasurer Hine–Watt Manufacturing Co.
Hipple, John Merton, 1898, M. E. in EE., Westinghouse E. & M. Co., Wilkinsburg, Pa.
Hirsch, Gustav, 1897, M. E. in EE., Columbus, engineer, Citizen's Telephone Co.
Hirst, Anna Brewster, B. A. (Antioch College), 1900, M. A., Yellow Springs.
Hoel, Sarah Elizabeth, 1893, B. Sc. (Mrs. W. M. Mills), North Tonawanda, N. Y.
Hoffman, Arthur Sullivant, 1897, B. A., Troy.
Hoffman, Hattie D., 1900, B. Ph., Columbus.
Homan, Frank, 1895, C. E., Cannelton, W. Va., Raven Coal and Coke Co.
Hood, Sherman, 1894, B. Sc., Meander, gardner.
Hoover, Frederic Roland, 1899, B. Ph., Columbus.
Hopkins, Charles Delnow, 1893, LL. B. (B. A., Ohio Wesleyan University), Athens.
Horton, Henry Pomeroy, 1889, B. Ph.
Hough, Benson Walker, 1899, LL. B., Delaware.
Houseman, Ruth U., 1897, B. Ph., Painesville, teacher in High School.
Houston, Anna Christine, 1892, B. Ph., 1895, M. A., Marysville.
Hovey, Clark Samuel, B. A. (Buchtell College), 1898, LL. B.,
Howald, Ferdinand, 1878, B. Sc., Rush Run, W. Va., manager of mining operations.
Howard, A. B., 1883, B. Ph., Jackson, Miss., clergyman.
Howard, Anna F., 1900, B. Ph., Columbus, 307 West Seventh avenue.
Howard, Curtis C., 1878, B. Sc., M. Sc., 115 Jefferson avenue, Columbus, professor of Chemistry in Starling Medical College.
Howard, Fanny Fern, 1896, B. A., Columbus.
Howard, Edward Davenport, 1894, LL. B., 1896, LL. M., Columbus, attorney.
Howard, John Wilmot, 1895, B. Sc., Columbus, assistant secretary, Board of Trade.
Howells, E. S., 1884, E. M., Massillon, Howells Mining Company.
Howells, Thomas J., 1897, E. M., Steubenville, O., Mingo Works National Steel Co., Mingo Junction, O.

Hubbard, Ralph Newton, 1891, B. Sc., Columbus, Columbus Machine Co.
Hughes, Raymond Mollyneaux, A. B. (Miami University), 1897, M. Sc., Miami University, professor of Chemistry.
Huddleson, Don Carlos, 1897, G. Ph., Columbus, assistant in Gymnasium, State University.
Huffman, Lillian Stuart, 1899, B. Ph., Columbus, 389 East Rich St.
Huggins, Burch Delaplaine, 1899 B. Ph., Hillsboro.
Hull, Mary Louise, 1894, B. A. (Mrs. C. H. Farber), Columbus, 392 West Seventh avenue.
Humphrey, J. Scott, 1879, B. Sc., Findlay, civil engineer.
Humphreys, Leona, 1895, B. A., Plain City, teacher in High School.
Hunt, William Franklin, 1887, M. E., attorney-at-law, New York Life Building, St. Paul, Minn.
Hunter, Madone C., 1900, M. E. in EE., Salt Creek.
Huntington, Arthur, 1899, M. E., Turtle Creek, Pa., Westinghouse Electric Manufacturing Co.
Huston, Charles H., 1897, LL. B. (B. S., Tri-State College, Ind.), Mansfield.
Hyde, Wilby Grimes, 1887, B. A. (LL. B., Cincinnati), Chillicothe, attorney-at-law
Hyle, Charles A., 1896, M. E. in EE., U. S. Weather Bureau, Mt. Tamalpais, California.

I

Imes, Marion, 1899, B. Sc. (Agr.), Durham, N. H., New Hampshire State College, student.
Ingram, Imogene, 1897, B. Ph., Columbus.
Innis, Lyman H., 1893, B. A., 1895, LL. B., Columbus, attorney, 323½ South High.
Ireland, Guy Llewellyn, 1895, M. E.
Irvin, Chadwick H., 1897, M. E., Lima, Draftsman, The Solar Refining Co.

J

Jackson, Frank Pierce, 1892, LL. B., 1893, LL. M., Columbus, attorney, 82 South Washington avenue.
James, Florence May, 1896, B. A. (Mrs. Oscar R. Flynn), Chicago, Ill.
Jaynes, Allan B., 1900, Washington, D. C., Census Department.
Jeffrey, James Fred, 1900, B. Sc., Columbus.
Jeffrey, Maud Dorothy, 1895, B. Ph., assistant in library, State University.
Jenkins, William B., 1893, C. E., Bellefontaine, District Agent Interstate Savings Investment Co.
Jenkins, Willis H., 1894, C. E., Columbus, Transitman, P., C., C. & St. L. Ry.
Jennings, Irvin G., 1899, LL. B., Zanesville.
Jennings, Levi E., 1897, M. E. in EE., Indianapolis, Ind., Central Union Telephone Co.
Johnson, Charles W., 1896, M. E. in EE., Norwood, Cincinnati, chief draughtsman Bullock Electric Mfg. Co.
Johnson, Earle S., 1900,, M. E. in EE., Plants.
Johnson, George Edward, 1892, C. E., L. & N. R. R., Louisville, Ky.
Johnson, Herbert Lincoln R., 1892, M. E. in EE.
Johnston, Frederick Symmes, 1899, B. Sc. (Agr.), Durham, N. H., assistant professor of Agriculture, New Hampshire State College.
*Jones, A. A., 1886, C. E., died May, 1894.
Jones, Arthur James, 1898, M. E. in EE., Turtle Creek, Pa., Westinghouse Electric and Manufacturing Company.

Jones, Aaron Wesley, 1891, B. Sc., Columbus, Gardner Insurance Agency.
Jones, Alexander Houston, 1895, M. E. in EE.
Jones, Benner, 1897, LL. B., Jackson.
Jones, Daniel D., 1893, G. Ph., Gallipolis, pharmacist, Epileptic Hospital.
Jones, Jesse Lee, 1890, B. A., Philadelphia, Pa., chemist, William Cramp & Sons, Ship Builders.
Jones, Paul, 1880, B. A., Columbus, attorney-at-law.
Jones, Pearl N., 1892, M. E. in EE., Pittsburg, Pa., engineer and salesman, Westinghouse E. & M. Co.
Jones, Richard Thomas, 1900, B. Ph., Columbus.
Jones, Smiley, 1894, E. M., Prescott, A. T.
Jones, William Francis, 1896, D. V. M., Cincinnati, Miami Medical College.
Judd, Horace, 1897, M. E., 1899, M. Sc., Brooklyn, N. Y., Instructor, Pratt Institute.
Judkins, Clyde H., 1897, LL. B. (A. B., Scio College), Flushing.
Junk, Harry Prior, 1895, LL. B., Columbus, attorney-at-law, 387 Oak street.

K

Kanmacher, Samuel H., 1900, M. E. in EE., Columbus, Superintendent Empire Gold Mining and Milling Company.
Karshner, George M., 1900., B. A., Columbus, student, O. S. U. Law College.
Keagle, Anna Brown, 1895, B. Ph., Columbus, teacher North High School, 59 West Fourth avenue.
Keating, David Thatcher, 1899, B. Ph., Columbus, 1317 East Broad street.
Keffler, Frederick, 1892, M. E., Anaconda, British Columbia, General Manager the British Columbia Copper Co., Ltd.
Keifer, William White, 1886, B. A. (LL. B., Cincinnati), Springfield, attorney-at-law.
Keiser, Romeo Orpheus, 1892, B. Sc., 1896, G. Ph., '98, M. D., O. M. U., '99 M. D., Cleveland Homeopathic Medical College, physician, Columbus.
Kellerman, Ivy, 1898, B. A., 1899, M. A. (Cornell University), Ithaca, N. Y., student, Cornell University.
Kellicott, William E., 1898, B. Ph., Columbia University, New York.
Kellison, Edward Lafayette, 1897, B. Ph., 1900, LL. B., Quincy.
Kemmler, Edward A., 1888, C. E., 895 S. High street, Columbus, assistant city engineer.
Kerr, Samuel Thompson, 1894, M. E. in EE., Martins Ferry, superintendent Municipal Electric Light Plant.
Kersey, William Rufus, 1899, M. A. (B. A., Earlham College), Columbus, 433 East Town street.
Kershaw, Francis Stewart, 1891, B. Ph., Boston, Mass.
Kershaw, Samuel Charles, 1892, B. Ph., Columbus, book-keeper, Columbus Bolt Works.
Kester, Fred. Edward, 1895, M. E. in EE., Columbus, assistant in Physics, Ohio State University.
Kiesewetter, Louis Frank, 1891, C. E. (A. B., Harvard, '92, and A. M., '93), Columbus, Cashier Ohio National Bank.
Kiler, Abdel William, 1896, G. Ph., druggist, Columbus, Eighth and High streets.
Kinder, Gordon D., 1900, B. Ph., Ottawa.
Kimberley, Charles H., 1900, B. Sc., Pharmacy, Columbus.
King, Robert James, 1899, B. A., Zanesville.
Kirby, Harriet R., 1898, B. A., Columbus, teacher in North High School.

Kirker, Harry L., 1889, B. Sc., with the Westinghouse Company, Sodelee Boite 56, Havre, France.
Kiser, Katherine Daniel, 1895, B. A., Columbus, teacher in High School.
Klein, David, 1900. B. Ph., Columbus.
Kline, Charles H., 1897, M. E. in EE., Dayton, city engineer and deputy county surveyor.
Knauss, William Henry, 1895, B. Sc., student, Starling Medical College, 1317 Dennison avenue.
Knecht, Arthur Edward, 1898, M. E., Akron, Stirling Company, Barberton, O
Knight, Caroline E., 1900, B. Ph., Columbus.
Knight, Ruby Ray, 1895, B. Sc., Middleport.
Knight, William A., 1900, M. E., Columbus, instructor in shopwork, State University.
Knopf, Eva S., 1895, B. Ph., Columbus, teacher in North High School.
Knopf, George W., 1883, B. Sc., Pittsburg, Pa., bridge builder.
Knox, Frank Stewart, 1900, E. M., Columbus.
Kohr, Donald Alexis, 1898, B. Ph., Westerville.
Krauss, Bertha Katherine, 1892, B. Ph., Ottawa.
Kreiger, Charles Henry, 1887, G. Ph., Columbus, superintendent the Kauffman-Lattimer Co.
Krumm, Charles S. M., 1896, B. Ph., 1898, LL. B., Columbus, attorney, 277 South Eighteenth street.
Krumm, Herbert Zettler, 1898, B. Ph., Columbus, 975 South High street.
Krumm, Lillian Louise, 1895, B. Ph. (Mrs. Harry Rush Wilson), Columbus, 1459 Bryden Road.
Krumm, Louis Ralph, 1898, M. E. in EE., Engineering Department Central Union Telephone Co., Chicago, Ill.
Krupp, William Emil, 1899, LL. B., Urichsville.
Kuhn, Valley Howard, 1896, M. E. in EE., Etna.
Kuhn, Harry Waldo, 1897, B. Sc., graduate student, Cornell University.

L

Lamb, Whitney E., 1900, M. E., in EE., Commercial Point.
Lamme, Benjamin G., 1888, M. E., Pittsburg, Pa., engineer, Westinghouse E. & M. Co
Lamme, Bertha A., 1893, M. E. in EE., Pittsburg, Pa., Westinghouse E. & M. Co.
Landacre, Francis Leroy, 1895, B. A., assistant professor of Zoology and Entomology, State University.
Landacre, Walter Alexander, 1891, G. Ph., Columbus, assistant professor of pharmacy.
Landis, Walter Victor Titus, 1895, B. Ph., Dayton.
Lane, Quinton R., 1898, B. Ph., 1900, LL. B., Attorney, Columbus.
Large, Joseph H., 1890, C. E., Whigville, O.
Laughlin, Hugh Clarence, 1890, B. A. (A. M., 1895, University of Nebraska), 1712 Bathgate avenue, New York, teacher in High School for Boys and Girls.
Lavery, William F., 1890, D. V. M., veterinary surgeon, State University.
Lawrence, Arthur K., 1897, G. Ph., Columbus, 69 North Seventeenth street, Pharmacist.
Layton, Roy Everett, 1895, B. A., 1897, LL. B., Wapakoneta, attorney.
Lee, Corless E., 1900, M. E. in EE., Speidel.
Lee, Edwin S., 1893, G. Ph., Columbus, druggist, 144 West Ninth avenue.
Lee, Robert M., 1897, M. E., Columbus.

Leffler, Edward Victor, 1896, G. Ph., Leipsic.
Lehman, John Wesley, 1899, B. Ph., Canal Winchester.
Lemert, Helen Ora, 1894, B. A., Columbus, teacher High School, 81 Twenty-second street.
Lentz, Alice B., 1897, B. Ph., Lloydsville.
Lentz, Theresa, 1893, B. Ph., Bellaire, teacher in High School.
Leonard, James Lincoln, 1893, LL. B. (B. S., Ohio Normal University), Welcome.
Levering, Orpheus D., 1893, M. E.
Lewis, Charles Montgomery, 1881, B. A., Columbus, with Columbus Evening Dispatch.
Lewis, Thomas K., 1894, B. Sc., Columbus, assistant in drawing State University.
Lincoln, Paul Martyn, 1892, M. E. in EE., Niagara, N. Y., assistant superintendent Niagara Falls Power Co.
Lindo, William C., 1896, C. E., Port Antonio, Jamaica, W. I., civil engineer.
Linebaugh, Jesse J., 1899, M. E. in EE., Schenectady, N. Y., General Electric Co.
Linson, Irvin, 1882, B. A.
Linville, Clarence P., 1900, B. Sc., Chemistry, Columbus, Fellow in Chemistry.
Lisle, Charles H., 1900, B. Ph., Pataskala.
Lisle, Dallas Gypsi, 1899, B. Ph., Ashland, Ky.
Lisle, Leslie Mae, 1899, B. Ph., Columbus.
Logan, Lavallette Lasea, 1896, E. M., Scranton, Pa., professor mine surveying, National Correspondence School.
Logsdon, Carey Lignori, 1899, B. Ph., Columbus.
Logsdon, Clement Jay, 1898, G. Ph., Newark, with Dr. J. H. Beatty.
Loomis, John Cooper, 1898, LL. B., Tiffin.
Lott, Charles Milford, 1895, M. E. in EE., Paulding, Supt. Electric Light Plant.
Loveberry, Clarence, 1896, D. V. M.
Lovejoy, Ellis, 1885, E. M., Union Furnace, chemist and superintendent Columbus Brick and Terra Cotta Co.
Lovejoy, Jesse R., 1884, B. Sc., Schenectady, N. Y., with General Electric Light Co.
Luce, George Ernest, 1897, LL. B. (A. B., Ohio Wesleyan University), Columbus, 95 Hamilton avenue.
Luse, Clara E., 1897, B. Ph., Mrs. Herbert Scott, Columbus.
Lusk, William Vinton, 1893, D. V. M., Ft. Wingate, New Mexico, veterinary surgeon, Ind. cavalry.
Lydenberg, Walter B., 1898, B. A., Dayton.
Lynas, Caroline, 1898, B. A., Columbus, 109 West Gay street.
Lynas, Charles E., 1898, B. A., Columbus, 109 West Gay street
Lyon, Arthur H., 1900, M. E., Wauseon.

M

Maag, Benjamin Franklin, 1899, M. Sc. (B. Ph., Wooster University), Mt. Eaton.
MacGuire, Charles White, 1895, G. Ph., '97, M. D., Toledo Medical College, Toledo, Ohio.
Machwart, Washington J., B. Sc. (Muskingum College), 1900, M. A., Mt. Eaton.
Mackey, Ure LaVerne, 1893, M. E. in EE. (B. A., Wooster University).
Magly, Robert A., 1897, G. Ph., 1896, LL. M., chemist, Bessie Iron Furance, O.
Magruder, Leonard Anthony, 1895, B. Ph., 1896, LL. M.

Maier, John Valentine, 1895, LL. B. (B. S., Northern Indiana Normal University).
Malone, William Ruskin, 1885, B. A., Toledo, with New York Life Insurance Co.
Manecke, Gilbert, 1897, LL. B., Fostoria.
Manley, Rush Emmett, 1894, M. E. in EE., manager of Exchange Central Union Telephone Co., Mt. Vernon.
Mann, Wilber Edwin, 1899, B. Ph., 1900, M. A., Columbus.
Marple, Charles Allen, 1885, B. Sc., Louisville, Ky., teacher of Science, Male High School.
Marquard, Frank Fred, B. L., 1896, C. E., Sharon, Pa., chemist, National Co.
Marshall, George Sidney, 1894, B. Ph., 1897, LL. B., Columbus, attorney, Second Assistant Director of Law, 1566 Neil avenue.
Marshall, William B., 1900, M. E. in EE., Columbus.
Martell, Leonard Roland, 1898, B. A., Columbus, 1665 South High street.
Martin, Edwin Dunlevy, 1891, B. Ph., Lee Centre, Ill., teacher.
Martin, George, 1897, M. E. in EE., Massillon, Central Union Telephone Co.
Martin, Percy, 1892, M. E. in EE., Milan, Italy, Mediterranean Electric Co.
Marvin, Charles Frederick, 1883, M. E., Washington, D. C., U. S. Weather Bureau.
Mason, George F., 1890, G. Ph., Milwaukee, Wis., student of medicine, Milwaukee Medical College.
Masters, George Albert, 1886, C. E., Chicago, Ill., Western Library Association.
Mathers, John Harrison, 1895, B. Ph., Conover.
Mathias, Frederick W., 1893, B. Sc., Toledo, teacher High School.
Matson, George H., 1892, G. Ph., 169 Hamilton avenue, Columbus, professor of Pharmacy, Ohio Medical University.
Matson, William Edgar, 1896, M. E. in EE., Lynn, Mass., with General Electric Co.
Mauer, George Clifford, 1892, D. V. M., Oak Harbor, veterinarian.
Mays, James Wesley, 1897, B. Ph., Columbus, student in College of Law, State University.
McAllen, William Johnson, 1894, C. E., engineer, Chicago, Ill., Illinois Steel Co.
McCall, Arthur Gillett, 1900, B. Sc. (Agr.), McGaw.
McCallum, Raymond, 1900, B. Ph., Dayton.
McCarter, Edward Bancroft, 1892, B. A., 1894, LL. B., Columbus, attorney, 737 Bryden Road.
McCarter, Flora, 1897, B. A., Columbus.
McCarter, Robert Dale, Jr., 1895, M. E. in EE., London, England, representing General Electric Co.
McCleary, Clayton A. (Ph. B. Franklin College) 1900, LL. B., Lorain.
McClelland, Chalmer Kirk, 1898, B. Sc. (Agr.), Andover.
McClure, Robert E., 1900, LL. B., Dayton.
McCormick, J. H., 1880, M. E., Dayton, National Cash Register Co.
McCormick, William Francis, 1896, M. E., Columbus, Cleveland avenue.
McCulloch, George Elmer, 1891, B. Sc.
McDowell, John Andrew, 1882, B. Sc., 949 Neil avenue, Columbus, cement engineer.
McFadden, John Franklin, 1878, B. A., Columbus, attorney-at-law, 92 North Twenty-first street.
McGregor, James Howard, 1894, B. Sc., New York, assistant in Zoology, Columbia University.
McGrew, John Alexander, 1895, C. E., M. of W., Pennsylvania Railroad Co., Logansport, Ind.

McGuffey, Francis Hoyt, 1894, M. E. in EE., New Lexington, O., U. S. Telephone Co.
McIntire, Alfred Heber, 1898, M. E. in EE., 1900, M. E., Schenectady, N. Y., General Electric Co.
McLaughlin, Annis, 1897, B. Ph., Columbus.
McLaughlin, James Audley, 1895, LL. B. (B. A., Monmouth College).
*McMakin, Amasa Brown, 1879, B. Sc., died May 22, 1891.
McNary, George Bull, Jr., 1896, M. E. in EE., Toledo, with Bissel & Co.
McPherson, William, 1887, B. Sc., 1891, M. Sc., 1895, D. Sc., 1899, Ph. D., University of Chicago, Columbus, State University, professor of Chemistry.
Mead, Clinton V., 1884, B. Ph., Denver, Col., attorney-at-law.
Mead, Rollo Nooman, 1895, D. V. M., Grand Rapids.
Mebs, George H., 1897, G. Ph., Columbus, Pharmacist, Columbus State Hospital.
Meek, Charles Wesley, 1894, LL. B., Toledo.
Meek, Edward Duncan, 1896, B. A., 1899, M. A. Glencoe.
Meek, William W., 1899, B. Ph., 121 Fifteenth avenue, Columbus, J. W. Meek & Co.
Mendenhall, Maurice H., 1893, D. V. M., West Elkton.
Menough, Arthur George, 1894, E. M., Apartado 17, Zacatecas, Mexico, assayer and chemist
Mercer, Frank Emmet, 1896, M. E. in EE., Lima, Ohio.
Merrill, Alice Louise, 1893, B. A., 6565 Yale ave., Chicago, Ill., Station O, teacher.
Merrill, Charles Wesley, A. B. (Denison University), 1898, LL. B., 326-330 The Nasby, Toledo, attorney.
Mershon, Ralph D., 1890, M. E., New York office Westinghouse E. & M. Co.
Mesloh, Charles W., 1889, B. A., 1895, M. A., assistant professor of German, State University.
*Metters, Allen, 1896, B. A., died January 22, 1898.
Metzger, Edward H., 1897, G. Ph., Columbus, assistant pharmacist, State Epileptic Hospital.
Mickey, Blanche D., 1898, B. Ph., Shelby, teacher.
Middleswart, Clarence Coulter, A. B. (Marietta College), 1898, LL. B., Constitution.
Middleton, Ambrose, 1895, G. Ph., Malta, pharmacist.
Miller, Carl James, 1898, B. Sc. (Agr.), Franklin.
Miller, Charles C., 1883, B. A., Lima, superintendent schools.
Miller, Daniel Elmer, 1890, G. Ph., Dayton, druggist.
Miller, Frank Case, 1893, C. E., Dwight, Ill., Supervisor, Chicago and Alton R. R.
Miller, Gretchen P., 1900, B. Ph., Columbus.
Miller, Harry Franklin, 1889, M. E., South Bethlehem, Pa.
Miller, Henry P., 1897, D. V. M. Sunbury.
Miller, Merritt Finley, 1900, B. Sc. (Agr.) Ridpath.
Miller, Walter McNab, B. Sc., 1885, Reno, Nev., professor of Anatomy and Physiology, State University.
*Milligan, James Porter, 1886, B. A., died, February, 1899.
Mills, William C., 1898, B. Sc. (H. & F.), Columbus, curator Archæological collection, State University.
Milne, Alexander, B. D. (Yale University), 1898, M. A., Duluth, Minn., pastor Pilgrim Congregational Church.
Mix, Edward W., 1888, B. Sc., Paris, France, superintendent "Le Societi des Establishments."

Mix, Melvin Noble, 1895, B. Ph., New York, The World, journalist.
Mock, George Herbert, 1891, B. Sc., Ohio State Savings Bank, Columbus.
Montgomery, Howard, 1896, B. Ph.
Moodie, Alice Haynes, 1890, B. A., Mrs. Arthur Hartwell, Chicago, Ill.
Moon, Victor C., 1900, B. Ph., Columbus.
Mooney, Charles Napoleon, 1900, B. Sc. (Agr.) Milan.
Mooney, Daniel Francis, 1894, LL. B., St. Mary's.
Moore, Edgar Howard, 1900, B. Sc., Columbus.
Moore, Henry Curtis, 1897, B. Sc., Washington C. H.
Moore, Virgil Owen, 1895, B. Sc., M. D., Toledo, 710 Starr ave., physician.
Morhart, Katherine Elizabeth, 1893, B. Ph., Pomeroy.
Morrey, Annie Eliza, 1896, B. A., Chester Hill.
Morrey, Charles B., 1890, B. A., 1896, M. D., Columbus, assistant professor Physiology, State University.
Morrey, William T., 1888, B. A.
Morris, Ingle H., 1900, LL. B., Columbus.
Morris, Clyde T., 1898, C. E., Youngstown, Youngstown Bridge Co.
Morrison, M. Frank, 1879, B. A., Mrs. S. H. Short, London, England.
Morrison, Robt. O., 1893, C. E., assistant on engineer corps, Erie and Ashtabula division of Pennsylvania Lines west of Pittsburg.
Morrow, Charles James, 1900, D. V. M., Tiro.
Morton, George L., 1884, M. E. (LL. B., National Law School), chief examiner, patent office, Washington, D. C.
Moses, Martha Allston, 1891, B. Ph., 1111 Hinman ave., Evanston, Ill., bookkeeper.
Moss, Blanche, 1893, B. A., Columbus.
Moss, William, 1898, G. Ph., Cambridge, O., Pharmacist.
Moyer, Henry E., 1893, B. Sc., Youngstown, chemist, Youngstown Steel Co.
Mull, Bert LaForrest, 1898, LL. B., Columbus, 114 Herman street.
Mullay, Annie, 1887, B. Ph., Chicago, teacher.
Mundhenk, Fred., 1896, B. Ph., Columbus, life insurance agent, 233 North Eleventh avenue.
Mundhenk, Herbert C., 1889, B. Ph., Brookville.
Mundhenk, Ruth, 1899, B. Ph., Dayton.
Munn, Mortimer Adam, 1894, C. E., Cleveland, Cleveland & Eastern Ry. Co.
Munson, Theodore, 1898, B. Sc., Zanesville.
Murray, Claude R., 1895, B. A., Middleport, principal of High School.
Murray, Frank Erskine, 1892, D. V. M., Greenfield, veterinary surgeon.
Myers, Albert B., 1900, E. M., Columbus.
Myers, Joseph Simmons, 1887, B. A., Pittsburg, editor Pittsburg Post.
Myers, Ord, 1895, M. E. in EE., inspector Metropolitan St. Ry. Co., New York.
Myers, Roy V., 1893, C. E., Dayton, Tenn., Dayton Coal and Iron Co., Ltd.
Myers, Uriah H., 1887, E. M., Pittsburg, Pa., Myers, Shinkle & Co.

N

Nagel, William G., 1895, M. E. in EE., Toledo, W. G. Nagel & Co., electrical supplies.
Needham, Harry J., 1900, M. E., Columbus.
Needles, Mana R., 1890, B. Ph. (Mrs. Kilpatrick), Owosso, Mich.
Nettleton, Arthur Warren, 1898, B. Sc. (Agr.), Medina.
Newton, Henry S., 1889, B. Sc., Syracuse, N. Y., general manager Syracuse, Lakeside and Baldwinsville Ry.
Newton, Samuel Donald, 1895, C. E., engineer on Southern R. R., Knoxville, Tenn.

Nichol, Gertrude Belle, 1899, B. Ph., Columbus.
Nicholson, Charles M., 1900, M. E. in EE., Columbus.
Nicola, Benjamin Di, 1900, LL. B., Barnhill.
Niewvahner, John Henry, 1891, B. A., Jackson, assistant cashier, First National Bank.
Noble, W. F., 1879, B. A., Tiffin, attorney–at–law.
Nold, John H., 1900, E. M., Columbus.
Nurian, Kerson, 1899, M. E., Turtle Creek, Pa., Westinghouse E. & M. Co.
Nutt, Arthur Chase, 1897, B. Ph., Worcester, Mass., instructor in English and German, Worcester Polytechnic Institute.

O

Obetz, Francis Henry, 1896, G. Ph., '99, M. D., Starling Medical College, Columbus, physician.
O'Brine, David, 1881, B. Sc., M. Sc., E. M., D. Sc., M. D., Urbana, physician.
Odebrecht, August, 1895, G. Ph., Columbus, with H. Braun & Sons.
O'Kane, Sarah Eliza, 1891, B. Ph. (Mrs. F. M. Raymond), 215 West Tenth ave., Columbus.
O'Kane, Walter Collins, 1897, B. O., Troy, journalist.
Orton, Clara Gregory, 1897, B. Ph., Columbus, 100 North Twentieth street.
Orton, Edward Jr., 1894, E. M., Columbus, director of the department of Clay–working and Ceramics, State University.
Orton, Walter Edwin, 1899, LL. B., Williamstown, Mass.
Osborn, Abner A., 1900, B. Sc., Columbus.
Osborn, Samuel Galloway, 1897, LL. B., Columbus, attorney, 275 East State street.
Osborn, Raymond Carroll, 1898, B. Sc., 1900, M. Sc., Columbus.
Ozias, Albert N., 1889, M. Sc., Principal High School, Minneapolis, Minn.

P

Pabodie, Robert Jewett, 1899, M. E., Watertown, N. Y., Watertown Steam Engine Company.
Page, William Herbert, 1892, LL. B., 1894, LL. M. (B. A., Yale), Columbus, professor of Elementary Law, State University.
Palmer, Walter K., 1893, M. E., State University, Lawrence, Kan., associate professor, Department of Mechanical Engineering, University of Kansas.
Parker, John Bernard, 1898, B. A., 1900, M. A., Danville.
Parmenter, William W., 1900, B. A., Mt. Vernon.
Patch, Homer Austin, 1896, C. E., Minneapolis, Minn., Draftsman, Gillette–Herzog Manufacturing Co.
Patchell, Owen P., 1889, B. Ph., Paul's Valley, Indian Ter., attorney–at–law.
Patchin, Rufus Harry, 1898, LL. B., Chardon, attorney–at–law.
Payne, Halbert Edwin, 1887, M. E., 256 Broadway, New York City, American Typewriter Co.
Peal, Allen Saunders, 1895, B. A., Chicago, Ill.
Pearce, George Downer, 1892, G. Ph., Pharmacist, South Charleston.
Pearl, Allen Sexton, 1894, M. E. in EE., Columbus, O., representative of Central Electric Company.
Pease, Edward Livingstone, 1895, B. A., 1899, LL. B., Columbus, 30 Monroe avenue.
Pedlow, Edward Benjamin, 1893, C. E., New Straitsville, superintendent Columbus and Hocking Coal and Iron Co.

Peppel, Samuel Vernon, 1899, B. Sc. (Chem.), Madison, Wis., Wisconsin Geological Survey, assistant in Ceramics, State University, Columbus.
Pence, David Arrel 1894, M. E., Lowellville.
Perkins, Earl Harley, 1893, LL. B., Wellington.
Peters, William Lincoln, 1885, M. E., Riverside, Cal., merchant.
Pfarr, Philip Lewis, 1896, B. Sc. (Agr.), Dennison, Iowa.
Phelps, Cyrus Alba, 1892, B. Sc., Sombereto, Jacataccas, Mexico, with Sombereto Mining and Milling Co.
Pierce, John Mattison, 1895, M. E. in EE., South Charleston.
Pilcher, Hastings Moore, 1895, M. E. in EE., Athens, telegraph operator and billing clerk.
Pitts, Grace Lenore, 1900, B. Ph., Columbus, graduate student, State University.
Plantz, Wyatt Garfield, 1894, B. A., Pomeroy.
Pleukharp, Chas. V., 1885, M. E., Lacanada, California.
Plimmer, Gertrude Alice, 1896, B. Ph., Columbus, 1188 Oak street.
Polk, Walter C., 1895, C. E., Indianapolis, Ind., assistant general foreman, Central Union Telephone Co.
Pomerene, Frank Etherington, 1891, B. Ph., 1895, LL. B., Coshocton, attorney–at–law.
Pool, Harwood Redington, 1881, B. Ph., LL. B., 62 Cedar street, New York City.
Porter, Mary Baxter, 1897, B. Ph.
Postle, Herman R., 1894, C. E., Joplin, Mo., civil engineer.
Postle, Kenneth F., 1894, B. A., Lancaster, Ky., teacher.
Powell, Chas. S., 1893, M. E. in EE., Cleveland, representing Westinghouse E. & M. Co.
Powell, Edward Thompson, 1896, LL. B., Columbus, attorney, 518 East Broad street.
Powell, Norman Clemson, 1895, D. V. M., Damascus.
Prall, Anna Dickson, 1898, B. A., Columbus.
Pratt, Fred K., 1900, C. E., New Philadelphia.
Price, Homer Charles, 1897, B. Sc. (Agr.), assistant horticulturist, O. S. U.
Priest, Frederick, 1895, D. V. M., Newark, veterinary surgeon.
Pryor, Charles Foster, 1898, LL. B., Columbus.
Pugh, Lawrence Randolph Whetzel, 1893, B. Ph., 1895, LL. B., Columbus, attorney–at– law, 13 Board of Trade.
Pulling, Margaret G., 1900, B. Ph., Columbus.
Pumphrey, John Homer, 1898, B. Sc., Clayton.
Putnam, Abbey Slocum, 1897, B. Ph., Fisher, Ill.

R

Radcliff, Charles Anson, 1895, B. Ph., attorney, Jackson.
Randall, Emilius Oviatt, 1892, LL. M. (B. Ph., Cornell University), Columbus, attorney–at–lew, professor in Law School, State University.
Randolph, Edward S., 1897, LL. B. (A. B., Ohio Wesleyan University), Somerset.
Rane, Frank William, 1891, B. Agr. (1892, M. Sc., Cornell), Durham. N. H., professor of Horticulture, New Hampshire College.
Rarick, Murray M., 1896, B. Sc. (Agr.), Jacksontown, physician.
Rasor, Samuel Eugene, 1898, B. Sc., College Springs, Iowa, Professor of Mathematics, Amity College.
Rawson, Levi, 1899, C. E., Sistersville, W. Va., Carter Oil Co.
Ray, Frank A., 1887, E. M., Columbus, professor of mine engineering, State University.

Ray, William M., 1893, C. E., room 825, Hickox Building, Cleveland, C. L. & W. R. R.
Raymond, Coles Abel, 1894, C. E., Wauseon, bridge draughtsman.
Raymond, Frank M., 1888, B. A., Columbus, attorney–at–law, 215 West Tenth avenue.
Raymond, Maud, 1899, B. Ph., Columbus, 558 Rich St.
Redick, Mary Glisson, 1898, B. Ph., Findlay.
Redrow, Walter L., 1900, B. Sc., Columbus.
Reed, Robert Browning, 1896, M. E. in EE., Zanesville, electrical contractor.
Reed, William Allen, 1897, E. M., Querida, Colorado, assayer and surveyor, Bassick G. M. Co.
Reese, William Daniel, 1891, B. A.
Reese, William Henry, 1896, G. Ph., Glen Roy, Pharmacist.
Reeves, Archibald C., 1887, C. E., 153 Superior avenue, Dayton, civil engineer.
Resler, Edwin D. (B. A., Otterbein), 1897, M. A. Westerville.
Rice, Herbert A., 1897, C. E., Jackson, teacher.
Rice, Mabel Elise, 1898, B. A., Columbus, student, Hubbard avenue.
Rice, Mary Washington, 1900, B. A., Columbus, Fellow in Economics, Ohio State University.
Rice, Susan Esther, 1899, B. A., Columbus, 111 West Fifth avenue.
Richardson, Hamilton Hutchinson, 1892, B. Agr., Brooklyn, gardner.
Richardson, William Waddle, 1899, B. Ph., Washington, D. C.
Richey, Luzerne A., 1897, B. Ph., Denver, Col., attorney.
Rickey, Alla B., 1889, B. Ph. (Mrs. Geo. H. Cless), Broad street, Columbus.
Rickey, Tallmadge A., 1900, B. Ph., Columbus.
Riddle, Howard Sterling, 1897, M. E. in EE., Akron, Diamond Rubber Co.
Riddle, Lumina C., 1897, B. Sc., 1898, M. Sc., Grand Haven, Mich., teacher in Science and Mathematics in the Akeley Institute.
Rietz, Henry Lewis, 1899, B. Ph., Gilmore.
Riggs, Ernest Jacob, 1895, B. Sc. (Agr.), M. Sc. (H. & F.), Raccoon Island, O.
Rightmire, George Washington, 1895, B. Ph., 1898, M. A., Columbus, teacher in High School and fellow and assistant in American History, State University.
Ritchey, Joseph C., 1890, B. Sc., Mingo Junction, with Junction Iron and Steel Co..
Roach, Simeon Andrew, 1899, B. Ph., Cleveland, New York Life Insurance Co.
Robbins, George A., 1899, B. Ph., Columbus, Lexington avenue.
Roberts, Cyrus Swan, 1898, E. M., San Lui Potosi, Mexico, with the Cia Metaturica Mexicana.
Robinson, Eckla Mazola, 1892, B. Sc. (Mrs. George Rowe).
Robinson, Erdis Geroska, 1893, C. E., Mexico, D. F., Mexico, Engineering Department of Mexican Central Railway.
Robinson, Zella Vina, 1898, B. Ph., 1900, M. A., Columbus, Highland street.
Rockwell, Mary Fannie, 1899, B. Ph., Columbus.
Roebuck, Carl Fletcher, 1900, B. Ph., Columbus, student State University Law College.
Rogers, Andrews, 1896, B. Ph., New York City, student, College of Physicians and Surgeons.
Rogers, Frank Persons, 1899, B. A., Columbus, 140 Warren street.
Rogers, James Bertrand, 1896, E. M., Steubenville, National Steel Co., Mingo Junction.
Root, Willis J., 1885, E. M., Columbus, chemist, National Steel Co.
Rowlee, Henry A., 1897, M. E., Columbus, inspector Ordnance Department U. S. A., The Rarig Eng. Co.

Ruhlen, Carl Marble, 1898, M. E., Honolulu, H. I., assistant inspector construction department, U. S. Army.
Ruhlen, Frank, 1896, B. Sc. (Agr.), Columbus, assistant in Agriculture, State University.
Rule, Ralph R., 1897, LL. B. (B. S., Tri-State College, Ind.), Greenspring.
Ruppersburg, Emma Anna, 1891, B. Sc., 1896, M. Sc., Columbus, teacher in High School, 842 South High street
Russell, Ralston, 1896, B. Ph., Pomeroy.

S

Sabine, Annie Ware, 1884, B. A., 1886, A. M., (1888, B. Sc., Mass. Institute Technology), (Mrs. W. H. Siebert), Columbus
Sabine, Wallace Clement, 1886, B. A. (M. A., Harvard), 53 Trowbridge street, Cambridge, Mass., assistant professor in Physics, Harvard University.
Safford, Robert Edwin, 1894, B. Sc., New York City, Mexican Metallurgico Co.
Sandoe, Lydora Olivia, 1893, LL. B., Mrs. Bachman, 1425 Bryden Road, Columbus.
Sater, Lowry Francis, 1895, B. Ph., 1897, LL. B., Columbus, attorney, 114 Buttles avenue.
Sayre, Charles B., 1900, B. A., Columbus.
Schaff, Mae B., 1900, B. Ph., Columbus.
Schaub, Edward Louis Tascher, 1885, M. E., Columbus, assistant superintendent Associated Charities.
Schaub, Charles E., 1897, E. M., Phillippi, W. Va.
Scheibell, William O., 1888, E. M., Columbus, secretary and general manager, The American Art Tile Co.
Schlesinger, Hugo Nathan, 1899, LL. B., Xenia.
Schreiber, George E., 1900, M. E. in EE., Ironton.
Schreiber, John Martin, 1899, M. E. in EE., Cleveland, Cleveland Electric Street Railway.
Schroll, Otto, 1886, C. E., Wheeling, W. Va., civil engineer, M. of W., W. B. & T. Ry. Co.
Schueller, Erwin Waldemar, 1892, B. A., M. D., 1894, Columbus, physician, 439 South High street.
Schwier, Minona, 1897, B. A., Columbus, 212 East Mound street.
Scott, Anna Neill, 1886, B. A., 1274 Summit street, Columbus.
Scott, Bertha, 1890, B. Ph., Indianola Place, Columbus.
Scott, Herbert, 1893, B. Sc., Columbus, pastor North M. E. Church, 2533 East avenue.
Scott, Charles Felton, 1885, B. A., Pittsburg, Pa., chief electrician Westinghouse E. & M. C., 6214 Sellers street.
Scott, Daisy Medill, 1887, B. A., Columbus, teacher in High School.
Scott, Dudley, 1900, B. Ph., Columbus.
Scott, Emma, 1888, B. Sc., Brindiban, India Missionary.
Scott, Ernest, 1897, B. Sc. (Agr.), Columbus, student, Ohio Medical University, 131 East Fifteenth avenue.
Scott, Mary Odella, 1885, B. A., Columbus, teacher in High School, 87 West Fourth avenue.
Scott, Mary Mermon, 1887, B. A., 1274 Summit street, Columbus.
Scott, Mary Bole, 1896, B. A., Columbus, teacher, 926 Oak street.
Sears, Walter James, 1894, B. Ph., Chillicothe, with Sears and Nichols Co.
Sedgwick, Edward Crayton, 1895, M. E. in EE., Columbus, Case Mfg. Co.

Selby, Augustine D., 1893, B. Sc., Wooster, botanist and chemist, Ohio Experiment Station.
Sellenings, Albert Eugene, 1896, B. Ph., M. D., Bellevue Interne, New York.
Seney, Allen J. (B. Ph., University of Michigan), 1899, LL. B., North Baltimore.
Serva, Adam A., 1893, M. E. in EE., Ft. Wayne, Ind., Fort Wayne Electric Works.
Seymour, Raymond J., 1900, B. Sc., Fellow in Natural History, Tuft's College.
Shark, Robert J., 1897, LL. B., Hamilton.
Sharp, Charles C., 1888, C. E., Corning, superintendent Mining Department Sunday Creek Coal Co.
Sharp, David Barton, 1893, LL. B., Columbus, 335 West Fourth avenue.
Shellabarger, Marley Rolin, 1897, B. Sc. (Agr.), Garland, Ohio.
*Shepard, Frank Reed., 1893, B. A., died August, 1893.
Shepherd, Charles W., 1900, C. E., Huron.
Sherman, Christopher Elias, 1894, C. E., Columbus, assistant professor in Civil Engineering, State University.
Shield, Wallace B., 1898, B. A., Kansas City, Mo., Manual Training High School.
Short, Sidney H., 1880, B. Sc., London, England.
Shuck, Carey Lucas, 1898, B. Ph., Columbus, "Columbus Evening Dispatch."
Shurtz, Olive L., 1898, B. Ph., Columbus, 26 King avenue.
Siebert, Wilbur H., 1888, B. A. (M. A., Harvard), Columbus, associate professor History, State University.
Sigerfoos, Charles Peter, 1889, B. Sc., 1897, Ph. D. (Johns Hopkins University), Minneapolis, Minn., professor of Zoology, University of Minnesota.
Sigerfoos, Edward, 1891, B. Ph., Fort Sheridan, 1st Lieut. Fifth Infantry, U. S. Army.
Simonton, Mark, 1895, M. E. in EE., Columbus, Electric Supply and Construction Co.
Simpson, Abigail Ellen, 1895, B. A., London, teacher in High School.
Singleton, Charles Tod, 1900, B. Ph., student State University Law College.
Sinks, Frederick Nicholas, Ph. L. (Yale University), 1898, LL. B., Columbus, 714 East Broad street.
Skinner, Chas. E., 1890, M. E., box 435, Pittsburg, Pa., Westinghouse E. & M. Co.
Slater, Burr Homer, 1895, G. Ph., Chesterville, Pharmacist.
Slyh, Emma Almeida, 1892, B. Sc., Marble Cliff.
Smith, Albertine, 1900, B. Ph., Columbus.
Smith, Alice May, 1897, B. Ph.
Smith, Burton Griffin, 1895, G. Ph., Detroit, Mich., chemist for the Ray Chemical Co.
Smith, Carl Clyde, 1890, B. Ph., Marietta.
Smith, Clarence Elmer, 1898, G. Ph., Columbus, student O. M. U.
Smith, David William, 1899, C. E., Columbus, Hocking Valley Ry. Co.
Smith, Edward E., 1897, G. Ph., Indian Territory.
Smith, Edward Trevett, 1898, LL. B., Holden, Mo.
Smith, Florizel, 1880, B. A., Spahr Building, Columbus, attorney-at-law, 970 Bryden Road.
Smith, Horace Prescott, 1886, B. Sc.
Smith, Maud Virginia, 1894, B. A. (Mrs. Thomas Chalmers), Port Huron, Mich.
Smith, Myron Alphonso, 1892, B. Ph., Columbus, with Keyes & Thomas, real estate agents.
Smith, Nathaniel B., 1893, D. V. M.
Smith, Philo Christopher, 1885, B. Sc., Middlebranch, farmer.
Smith, Virginia Roletta, 1900, B. Ph., Columbus.

Smith, Warren Lee, 1899, LL. B., Columbus, 29 East Dodridge street.
Snider, Charles M., 1897, B. Sc. (Ind. Arts), Columbus, 162 West Mound St.
Snider, Jesse Worthington, 1893, LL. B., LL. M., Columbus, 340 Denmead ave.
Snively, Harry H., 1895, B. A., Columbus, teacher in High School, 1332 Highland street.
Snow, Walter A., 1897, B. Ph., Park Place, Minneapolis, Minn., Pastor Congregational Church.
*Snyder, Henry, 1879, B. Sc., 1892, M. Sc. Died September, 1898.
Snyder, James Edward, 1892, LL. B. (B. A., Wooster University).
Snyder, Walter S., 1897, LL. B., Columbus, Attorney, 69 North Fourth street.
Somermeir, Edward Everett, 1898, G. Ph., Columbus, assistant in Mining and Metallurgy, State University.
Southard, Eustace Elden, 1895, G. Ph., Columbus, pharmacist, 470 Oak street.
Southard, Thomas Campbell, 1896, B. A., Columbus, 470 Oak street.
Sparks, Edwin Earle, 1884, B. A., 1892, M. A., Chicago University, assistant professor, Chicago, Ill.
Spencer, William Henry, 1891, G. Ph., Sandusky, with Strong and Spencer.
Spencer, Ralph Oliver, 1899, B. A., Columbus.
Sperr, Frederick W., 1883, E. M., Houghton, Mich., professor of Civil and Mining Engineering, Michigan School of Mines.
Sprague, Charles Franklin, 1896, B. A., 1899, LL. B., Wapakoneta.
Sprague, Clarence Milton, 1899, C. E., Columbus, Room 2, Union Station, Assistant on Engineers' Corps, P., C., C. & St. L., Indianapolis Div.
Sprague, William Ralph, 1899, B. Ph., Columbus, 71 West Tenth avenue
Spurrier, John Randolph, 1896, M. E. in EE., Wilkinsburg, Pa., Westinghouse E. & M. Co.
Staley, Marcellus, 1899, M. E. in EE., U. S. Transport Meade, chief electrician.
Stanberry, Charles L., 1892, G. Ph., Pharmacist, McConnellsville.
Starbuck, Daniel Carl, 1899, M. E. in EE., Care U. S. Despatch Agent, N. Y., U. S. S. Chicago.
Steeb, Carl Eckert, 1899, B. Ph., Columbus, accountant, O. S. U.
Stephenson, Henry Thew, 1894, B. Sc., Bloomington, Ind., instructor in English, University of Indiana.
Stevens, Frank M., 1897, LL. B., Elyria.
Stevenson, Amos Claude (A. B., Oberlin College), 1900, LL. B., Fostoria.
Steward, Charles Benjamin, 1900, B. Sc. (Agr.), Marcy.
Stewart, Edwin Earle, 1895, LL. B. (M. A., Antioch College), attorney, Springfield.
Stewart, Lee Raymond, 1896, C. E., Philadelphia, Pa., N. Y. Ship Building Co.
Stewart, Harford Toland, 1896, M. E. in EE., Agent General Electric Co., Columbus.
Stiger, Thomas A., 1899, LL. B., Bucyrus.
Stimson, Charles Leslie, 1899, B. A., Columbus, 737 Bryden Road.
Stimson, George, 1900, B. A., Columbus, 737 Bryden Road.
Stinebaugh, Isaac Long, 1892, C. E., Port Clinton, deputy to county surveyor
Stone, Carlton Elijah, 1899, C. E., Gallipolis, civil engineer.
Storer, Norman Wilson, 1891, M. E. in EE., Pittsburg, Pa., Westinghouse E. & M. Co.
Storer, Simon B., 1893, M. E. in EE., Syracuse, N. Y., engineering and salesman, Westinghouse E. & M. Co.
Stouffer, Charles Irwin, 1893, LL. B., Columbus, 387 Oak street.
Stoughton, George L., 1895, LL. B. (B. A., Otterbein University).
Stull, Emmett Willet, 1894, M. E. in EE., Johnstown, Pa., draughtsman Motor Department The Lorain Steel Co.

Stump, Franklin Pierce, 1892, B. Agr., Convoy, farmer.
Stump, John William, 1895, C. E., county engineer, Fairfield, Co., Ohio.
Stump, William Lisle, 1897, G. Ph., 1898, M. Ph., Columbus, Pharmacist.
Surface, Harvey Adam, 1891, B. Sc., 1892, M. Sc.
Sutherland, Margaret, 1898, B. Ph., (Mrs. Benj. Flynn), Columbus, Neil ave.
Sutphen, James Leonard, 1897, G. Ph., Columbus, 673 Livingston avenue.
*Swartzel, Earl Glenn, 1895, B. Sc., died March, 1899.
Swartzel, Karl Dale, 1893, B. Sc., 1894, M. Sc., Columbus, assistant professor of Mathematics, State University.
Swisher, William Henry, 1896, G. Ph., M. D., Eaton, Physician.
Sykes, William Edgar, 1898, LL. B., Marietta.
Sylvester, John E., Jr., 1898, B. Ph., Wellston, editor "Wellston Telegram."

T

Talbot, Ellen B., 1890, B. A., Troy, N. Y.
Talbot, Herbert Swan, 1898, B. Ph., Columbus, clerk Columbus Board of Trade, 640 Franklin avenue.
Talbot, Mignon, 1892, B. A., 640 Franklin ave., Columbus, teacher in High School.
Travis, Fred Lant, 1900, B. A., Pana, Ill., teacher.
Travis, John F., 1900, B. A., Columbus, Fellow in Mathematics, Ohio State University.
Taylor, Arthur W., 1894, E. M., Cleveland, chemist for Otis Steel Co., Ltd.
*Taylor, Francis Asbury, 1885, B. A., died July 25, 1891.
Taylor, Alexander R., 1895, B. Sc.
Taylor, Fredric Wellington, 1900, B. Sc. (Agr.), Wooster.
Taylor, Ralph Buren, 1895, B. A.
Taylor, Joseph Russell, 1887, B. A., M. A. (Columbia University), Columbus, assistant professor English Literature, State University.
Taylor, Pearl V., 1897, B. A., Columbus, 46 West Noble.
Teter, Anstie Welsh, 1896, G. Ph., Bainbridge, Pharmacist.
Thomas, James O., 1897, C. E., Columbus, 404 West Goodale.
Thomas, Lawrence David, 1900, B. Ph., Lancaster.
Thompson, Carmi A., B. Ph., 1895, LL. B., Ironton, city solicitor.
Thompson, Howard N., 1888, B. Ph., Washington, D. C., correspondent Associated Press.
Tomlinson, James Rowe, 1892, C. E., Cleveland, Forest City Iron Works.
Towne, Robert S., 1879, B. Sc., E. M., New York, N. Y., president Mexican Northern Railway.
Townshend, Alice Margaret, 1880, B. A. (Mrs. Charles Wing), Columbus.
Townshend, Arthur Bailey, 1878, B. Sc., M. D., 22 West 32d street, New York, New York, N. Y., physician.
Tufts, Charles Hill, 1899, E. M., Cleveland, assistant chemist Otis Steel Co., Ltd.
Tupper, Eugene L., 1893, G. Ph., Ottawa, physician.
Turner, Arthur M., 1893, M. E. in EE., 281 Oak street, Chicago, Ill.
Turner, Frederick Lewis, 1897, B. A., 1898, M. A., Oak Park Hills, teacher in High School.
Twiss, George R., 1885, B. Sc., Cleveland, teacher of Physics in High School.
Twiss, Edith Minot, 1895, B. A., Mt. Vernon, teacher in High School
Twiss, Marion Evans, 1897, B. A., Columbus, State Library.
Tyler, Frederic Jared, 1900, B. Sc. (H. & F.), Perry.

U

Uncles, Margaret Anna, 1897, B. A., Columbus, Gill street.
Underwood, Ella, 1898, B. A., Mrs. O. A. Davis, Alliance.
Urban, Harry Marshall, 1898, C. E., Pittsburg, Pa., "Pan Handle" R. R., assistant engineer corps.

V

Vance, Mary Grace, 1898, B. A., Danville, Ky., Caldwell College.
Vandervoort, William P., 1886, E. M., Morrow, superintendent of schools.
Van Harlingen, Edward M., B. Sc., 1883, M. Sc., 1897, Columbus.
Viets, Willis B., 1886, E. M., Parryville, Pa., chemist, Carbon Coal and Iron Co.
Voke, Lewis F., 1893, G. Ph., Columbus, M. D., Starling Medical College, physician, France Medical Institute.
Voorhees, Burt Fisk, 1894, LL. B., Coshocton.
*Voorhees, Charles W., 1892, LL. M. (B. Sc., Scio College), died 1898.
Voorhees, Isaac M., 1894, B. Ph., Cadiz, journalist, editor of "Harrison News."
Vornholt, Julius Franklin, 1898, B. A., New Bremen.
Vosskuehler, Joseph H., 1900, M. E., Dayton.

W

Wadsworth, F. L. Olcutt, 1888, B. Sc., E. M., M. E., Director of Allegheny Observatory, Allegheny, Pa.
Wagstaff, Edward A., 1893, G. Ph., Niles, pharmacist, Jones and Wagstaff.
Waid, Clarence William, 1898, B. Sc. (H. & F.), Durham, N. H., Assistant in Horticulture.
Walker, Frederick William, 1896, B. A., Columbus, 46 North Lazelle St.
Walker, James Madison, 1896, C. E., Chicago Junction, Assistant Res. Eng. B. & O. R. R. Co.
Walsh, Annetta Curtis, 1897, B. A., Columbus, 148 Buttles avenue.
Walsh, Mary Helen, 1896, B. Ph., Columbus, 148 Buttles avenue.
Ward, J. C., 1880, B. A., Painesville, engineer and surveyor.
Ward, Philip Emerson, 1899, B. Ph., Willoughby.
Warden, Leonard C., 1899, B. Sc. (H. & F.), 42 Jackson Boulevard, Atlantic Building, Chicago, Ill.
Warner, Cora, 1882, B. Ph., corner Hubbard and Dennison aves., Columbus.
Warren, Arthur Robert, 1893, LL. B., Columbus.
Warren, Grant Alexander, 1894, LL. B.
Watson, Bensen Gruber, 1896, B. Ph., Columbus, attorney, The Garland.
Watson, Edward T., 1897, B. Sc., Chillicothe, teacher in High School.
Watt, Sern P., 1886, M. E., Chicago, Ill., Vice President and Mechanical Expert, Hine-Watt Mfg. Co.
Weaver, Mary Luretta, 1891, B. Ph., 231 Church street, Urbana.
Weaver, Harry Bright, 1894, LL. B. (B. A., Ohio Wesleyan University), Circleville, attorney.
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Webber, Karl T., 1897, LL. B., Columbus, attorney, 2585 West Broad.
Weick, Charles William, 1898, B. Sc. (Ind. Arts), New York, Professor Manual Training, Columbia University.
Weidner, George F., 1887, G. Ph., Columbus, Kauffman-Latimer Co.
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Weisman, Laura A., B. Sc. (Dom. Sci.), Columbus.

Welch, Clark J., 1888, C. E., Pittsburg, Pa., assistant engineer, Keystone Bridge Works.
Welch, Oliver Bartlet, 1895, M. E. in EE., Dennison, electrician, United Electric Co.
Weld, Harry P., 1900, B. Ph., Marysville.
Wendt, William Carl, 1889, G. Ph., 901 South High street, Columbus, Heer's Pharmacy.
Wertz, Edwin Slusser, 1899, B. Ph., 1900, LL. B., Dalton.
West, Earle Downs, 1900, B. A., Columbus.
Whitacre, Horace J., 1891, B. Sc., 1895, M. D., Columbia University, Cincinnati (Mt. Auburn), physician.
Whitacre, Marion, 1894, B. Sc., 1899, M. D., Columbia University, Cincinnati, physician.
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The State

and

Education

Annual Address

at the

Commencement Exercises

of the

Ohio State University

by

President William Oxley Thompson

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The State and Education

By the very gracious courtesy of my colleagues in the Faculty of the Ohio State University—I have been invited to deliver the annual address at this Commencement and have the privilege of transforming what is ordinarily an arduous task into a delightful pleasure. I appreciate the honor that has thus been conferred upon me and express my pleasure in having the opportunity, at the close of my first year's work, of speaking to my fellow laborers in the Faculty and to the assembled friends of the University and of higher education upon the work in which we are engaged. I shall not attempt any thing new or sensational but invite you to think along with me for a half hour or more while I give expression to some thoughts on the familiar theme—The State and Education.

The Interest in Education.

Some years ago while waiting in turn for my baggage in the splendid triumph of modern architecture used for a railway station in the city of St. Louis, I fell into conversation with an old gentleman who was returning homeward after having crossed the continent. The only remark that left an impression upon me was—"This system of checking baggage is beyond my comprehension." He could not understand how the world of traffic and business had been organized so as to make travel for him a luxury without responsibility. Like many other people he had not seen that the inventive genius of our people and the business sagacity had combined in the interest of the public comfort and welfare. There is nothing more characteristic of our civilization than the evident intention to make everything serve the interests of the people. There are opposing forces, to be sure, but the net result will show that the greatest advance civilization has made is in the increasing dominion over the world that has carried with it the culture, the comfort and the convenience of man together with the greater efficiency in his service.

Among these forces education is, perhaps, the most widespread and far reaching. The close observer in his travel can-

not fail to be profoundly impressed with the universal interest in education. In every class of society he will find embedded the belief that it is of the highest value. All believe in it and all are willing that it shall be supported. One pursues it because he unites it inseparably with any considerable success in life, or because his desire for place and position is so controlling an ambition that he sees an education necessary to meet the requirements of the position to which he aspires. Others believe that education leads to mastery over poverty and many of the unpleasant features of life. Some regard it as the escape from drudgery. Others are lured on by the hope of a fuller and richer life to which it invites.—The culture it brings, the power it developes and the growth it insures, all unite to make the picture attractive. From one cause or another all people of all classes unite in the support of education. The Church and Christian men for very evident reasons have shown a commendable enthusiasm in the work. Those who apparently lack in the appreciation of purely Christian work are equally eager to push on the work of education.

It happens therefore that the public mind is as clear on the necessity of education as on the necessity of government. That education is desirable, valuable and necessary is a fundamental proposition now past the point of debate.

The Growth of Educational Sentiment

As we trace the development of the interest in education we cannot fail to notice the increasing place that public education occupies in our history as a result of the active interest and support of the State. The time was when even an elementary education was a private or family matter. It so continued for a long period in the Southland. Higher education was the result of endowment by private benevolence or the privilege of the few who were able to pay well for instruction. It is almost within memory when the private select school was the special privilege of the few. There was a certain aristocracy that attached itself to those who enjoyed the opportunity of the school.

The advent of the free public school gradually brought the advantages to all and changed the sentiment of the people. Special taxation, at first supplemented by subscription papers, made it possible to reach larger numbers. Steadily the free school made its way against all obstacles. It is not entirely false to say that the adoption of our Constitution was celebrated by large grants of land in which provision was made for public edu-

cation. In the North-west territory where we now live the ordinance of 1787 struck the key note that made a perpetual allegiance between the cause of education and the millions who should inhabit this wide expanse. The words are—"Religion, morality and education being essential to good government, schools and the means of education shall be forever encouraged." No doubt we see larger things in this utterance than the writer saw but it is worthy of note that so liberal a sentiment should be central in the first great charter of government for the new territory. In these days nearly every grant of public land sets apart a portion of it for public and higher education. The land grant colleges provided for in the Morrill Act are a logical result of the earlier theory. All this has grown out of the doctrine that public land should in some way minister to public need. It was early seen that government was not the only need. The means of education were such a need. To make the public lands permanently endow education was to perpetuate the people's interests. That Congress was so tardy in recognizing the right of Higher Education to a liberal support is only proof that conservative legislators are not always as wise as they are conservative. But it must not be assumed that this development has come at light cost or without a struggle. The public school has always been opposed and impeded in its progress. There always have been men who could find legal arguments, constitutional grounds or a social philosophy that proved the folly of public education. It was taxing the many for the few or it was a foolish attempt at the impossible. It was plunging the State into a benevolent agency or creating an institution where political miasma would breed corruption and death to the State by way of eventual bankruptcy. These educational obstructionists are now face to face with the important truth that although we are spending more money on public education than our fathers ever dreamed of, the State was never so rich or so resourceful as now and no money has been so free from scandal as the educational funds. If it be true that full many a flower is born to blush unseen it seems equally true that many a man has been born, like the Presbyterian elder, simply to raise an objection. However the great current has moved right on.

When the free public school has won its place a great victory has been gained for the common people. The most democratic institution of our country was fairly established and there were some things of which the people could not be robbed. Gradually

the High School appeared here and there in the more favorable places. Then the debate was renewed. We were gravely told that a common school education was all that was necessary and all the State was bound to provide. That was enough to make good citizenship and citizenship was the great concern of the State. The debate continued. Occasionally a little Latin, Geometry or a show of worldly science made appearance against a protest. A horrible nightmare disturbed the dreams of the defenders of the old order of things. The schoolmaster persisted. The boys who had enjoyed a taste of the High School were in favor of improvement and progress. Gradually and steadily the High School grew until it is now the most dominating and far reaching force in public education.

Subsequently came the development of the State University, especially in the newer West where long cherished traditions had not full control. They came in response to a growing popular demand. Ohio, the first state carved out of the North-west territory, was the last to join the ranks of the great sisterhood of western states and organize such an institution. In the history of education no phenomenon has been so remarkable as the growth and development of these universities. They mark a distinct era in the history of higher education. They have held up new ideals and broken down old barriers. They have destroyed many idols fondly worshipped. They are the first great and systematic attempt to bring higher education within the reach of all the people. They have been built by the people and for the people. Democracy rather than aristocracy has been the ruling idea. Under these ideals these institutions have been planted and have grown to be determining factors in our civilization. As they are better understood they are more appreciated. In these schools nearly three thousand instructors are educating over thirty thousand students. The wealth at their command in view of their age, and the equipment now in use is without a parallel in the history of education. In view of these things we may well address ourselves to a study of the State's relation to public education by consideration of a few propositions.

The New Theory of the State

First of all let me remind you of the importance of the new doctrine of the state now so universally accepted.

As the distance widens from the days of the Civil War some of its results stand out in bolder relief. Among these is the new theory of the state. The older writers seemed unable to get

away from the doctrine of selfishness as underlying all combinations of men. Rosseau's social contract assumes it as the basis of Political Society. Hobbes openly avows the doctrine. Spinoza reaffirmed it. The police theory of the state was a natural conquence. This in simple statement is, that the chief function of government is to preserve order and protect the natural rights of men by maintaining the peace. The policeman's club is not only the symbol of authority but it is of the very essence of government in that it represents force and enforced quiet. This explains why the policeman's club and liberty have never been the best of friends. Under such a theory there was little opportunity for education. The State's business was not to stimulate the good but to repress the bad. The State had no interest in helping a man to do the right thing. The delight was to hit him when he had done the wrong thing. The state was neither interested in, nor responsible for, ignorance. Its own harshness took refuge behind the legal maxim that ignorance of the law excuses no one. Under this condition it became necessary to define very carefully the rights of men. As a matter of fact this subject is elaborately treated by all the earlier writers on politics and government. The reason is evident. All a man's dangers did not arise from the thief, the robber and the highwayman whom the police would punish. It was also necessary to have a protection against the selfishness and ignorance of the police power. Thus far and no farther had to be enacted in protective statutes.

The refinements of this police theory are discoverable in the French Revolution. It is easy to trace the effect of Rosseau, Hobbes and DeTocqueville in the theories of early Americans and in our own Constitution. It was as natural as the rising of the sun that there should be opposing theories in the Constitutional Convention, and that in our early history we should see these forces often arrayed against each other. There was the police theory of the state strongly opposed to all internal improvement and to every expansion of the functions of the State through the agency of government. At the same time the Jeffersonian doctrine of liberty and equal rights of the people as expressed in the Declaration of Independence had paved the way for a popular sovereignty. The ideas of strength as represented by Hamilton and of freedom as represented by Jefferson were thought to be irreconcilably antagonistic notwithstanding the fact that both men were in Washington's cabinet. Many are

the inconsistencies that mark the pathway of all the distinguished men whom we are proud to call "the fathers." However the contest continued and the first fifty years of our history under the Constitution prepared us for a war that shook the country from center to circumference—all because men were loyal to their convictions. At the close of this war as the smoke cleared away the nation rose to a new consciousness. As Mr. Garfield put it the war settled the question that this was a nation. In this new consciousness were the two elements of strength and liberty—sealed in an indissoluble union and the people said—the Union *now and forever*. The freedom, the liberty of the people is here in all its simplicity while the strength and virility is preserved. We have gathered up the best of both men's theories and cemented them in a perpetual friendship and declared that a government of the people, by the people and for the people shall not perish. This new theory of the state proposes to be true to history and to hold on to the policeman's club for the sake of emergencies while the major portion of our time and energy will be used in teaching man how to live without it. The old theory regarded war as the great business of the state. The new theory says that peace is the normal condition of society. War is the accident and the incident. Peace is the great occupation. The great problem of government is not therefore how to provide for war but how to promote peace.

It is not without significance therefore that just as this new consciousness of the State was expressing itself Senator Morrill was able to secure legislation which laid the foundations of the land grant colleges and by that act forever committed the nation to the pursuit of the peaceful occupations. It was the logical result of the new theory of the State. Its importance will only be appreciated when we discover that it is the foundation upon which the future of public higher education will securely rest.

It is further significant that within this same third of a century since the Morrill Act we should see the most remarkable uprising in favor of popular education ever witnessed. I speak now not merely of the state's patronage of all grades of public education but of the wonderful benevolence of individuals as expressed in the increased gifts to Harvard, Yale and Princeton in the East and all along the line to the Western coast where the Stanford University stands as the latest expression of private beneficence. This condition cannot be explained by the mere increase of wealth. There has been a great change of sentiment.

Public duty is imperative. Even the private citizen feels obliged to take up the burden.

It is well therefore that we note these changes that have occurred. The time was when the king was the state. Now the people are the state. The time was when we went to the king's court as the fountain of law and justice. Now we appear before the peoples' tribunal where officers are sworn to support the fundamental law which recognizes the people as the source of both law and authority. From the divine right of kings we have come to the divine right of the people. From this new and broader conception of the State interesting themes arise. If I had time to inject into this address a short sermon I would persuade you that in dethroning the kings we had enthroned the Christ—but I must pass that. My purpose to-day is only to emphasize to you that this new conception of the state furnishes a most natural and rational basis for public education. The state through the agency of government now undertakes to do its duty by providing against the exigencies of war—the ravages of disease—and by promoting the universal peace, prosperity and welfare of the people.

The Basis for Public Education.

When however the doctrine of education is fairly proclaimed and when men recognize that the State has gone into the business, the question will not rest until we have found a satisfactory foundation on which to build the whole theory of public education. From what has been said it is clear that the new conception of the state takes account of more than mere defense and protection. It looks to a healthy, desirable development of the people. The new belief is that the state's duty goes beyond the narrow limits of earlier years and that as civilization advances the sphere and duty of the state will correspondingly widen. The old doctrine of rights was entirely satisfied with mere existence. There was no belief that a person had any right to help of any sort or that there was any duty of a positive sort attaching to government. The functions of government exhausted themselves in seeing that a man was not imposed upon and his rights not invaded.

As late as 1870 Mr. Herbert Spencer put himself on record in his "Social Statics" as saying that the state had no more right to administer education than to administer religion. He regards taxation for either purpose as an infringement of the rights of the person taxed and therefore wrong. He argues at length that the

child has no right to education inasmuch as a neglect to educate did not actually invade any natural right with which the child was born.

For a young man educated in the atmosphere of modern thought and life to fall suddenly upon Mr. Spencer's chapter on National Education, would render him unable to believe his eyes in reading, so completely have we turned away from the earlier position. At the vital point in his argument modern thought takes issue. We now distinctly teach that society is a unit and burdened with some responsibility. Children born into this world without their consent but with the deliberate consent of society have some rights that society organized in the state is bound to recognize and respect. These are not simply the right of existence as the child may be able to prolong it. The right to a healthful growth of the prophetic powers with which the child has been endowed is sacred. This right involves a duty on the part of society. I do not mean to say that rights grow out of duties or that duties grow out of rights, but that rights and duties are correlative so that where rights exist corresponding duties are always found. The real issue therefore is whether this fuller and broader definition of rights can be maintained. If this can be done then the word duty shines out in clearer light. We have come to believe that society cannot organize itself under the forms of government and escape responsibility. The state operating through the agencies of government is bound to be ethical. Otherwise it cannot show any sufficient reason for existence. The state cannot, like a corporation, plead that it has no soul and no conscience. The whole basis for law both in the local and the international spheres is an ethical basis. There is no truth in the logic that would argue that the whole people may be less moral than the individual. The truth is the state is under obligations to be more so. The whole array of governmental forces with which we are familiar is based upon the necessity of ethics. There can be no escape from the conclusion that the only state that can successfully maintain its right to existence is the ethical state. The history of war from whatever point you view it will support this conclusion.

But now ethics is essentially a question of relations. There is no such thing as ethics in the abstract and apart from the conception of relations. The whole theory is based upon concrete relations. This being true the state may not be indifferent to its own members and yet maintain its ethical character. The truth

is the state is under infinitely greater obligations than most people have either believed or affirmed. It is often said that hospitals, asylums and eleemosynary institutions of all kinds are the outgrowth of Christianity. This is true and yet it is not quite the truth. The truth is, that Christianity has taught a new ethics for the state. Paganism was weak at this point. But when Christianity had awakened a new conscience and a new consciousness and had revealed the new relations between men, the state that would govern such men was put under the bonds of a new duty. To divorce the state from ethics is suicidal. You cannot separate life into political, social, secular and ethical sections. The truth is that ethics is a fundamental science that emerges at the very first and simplest relations established between men or between men and the state. It must therefore touch all questions—social, political or secular.

The new theory of the state recognizes the doctrine of duty. There is an element of oughtness in the state's relation to the real needs of the people. The state must do its duty according to the measure of its ability. In other words the state exists for the people. At this point we see that the fundamental question is a question of fact. What are the real needs of the people? To that question the state is bound to address itself, and having discovered the needs, to do its duty in the premises. Our theme today limits our inquiry therefore to one question, viz., whether education is a real and universal need. Is this need of such a nature as to call for the state's help as a matter of duty? To this question I give a most cheerful and unhesitating affirmative. But some one will immediately ask if there are not other needs. Most assuredly. Education is not the only duty of the state. We need however, to be on our guard against the sophistry that responds by saying that wealth is also a need. So also is a comfortable house and on through the list. The fallacy reveals itself when we remember that wealth is not a fundamental necessity but that manhood and character are. The state is not organized for the purpose of creating wealth. Its greatest interest is manhood. It is well to remember that no person was ever born with a natural right to wealth. The most that can be said is, that he was born with a right to acquire it honestly. On the other hand the strictest interpretation of the doctrine of rights has allowed the right of life and the protection of it. My contention is that the right to growth and development is as secure and sacred as the right to protection. There is no occasion for

alarm at this doctrine. Public education has been called paternalistic or socialistic for the lack of a better term. The truth is, it is neither paternalism nor socialism.

This basis on which I place the right and duty of public education is very much broader and more secure than many current notions. It is often said that we educate in order to citizenship, a very desirable result. But as every one knows the definition of citizenship is very uncertain. No such narrow basis would ever support present practices. All our education goes beyond any conception of citizenship that would be introduced into a discussion of this question. Besides it is absolutey impossible to do such a thing. Education never reaches the point of citizenship. This whole theory puts it upon the basis of expediency—a position which cannot be successfully defended for any extended system of education. Then too, the common doctrine is familiar that a democracy cannot be maintained with an ignorant constituency. This is too true to need debate. The insufficiency of such a supposition for a basis of public education lies in the fact that no man can determine the amount of education necessary to maintain any given type of democracy. The moment we assume such a position we are met with the fact that the indefiniteness of the terms leads to an endless discussion as to the amount of education the state may provide. In my judgment the continued discussion of this question has largely arisen from the false premises on which the doctrine of public education has been based. But when we assume the state's duty and the individual's right the problem becomes simpler and we need discuss but the two propositions—the needs of the people and the ability of the state to meet those needs.

I may pass now to a few remarks upon the quality of the education the state provides. Very much anxiety has been felt about the secular and godless character of the state schools from the public schooi on through the university. All good people must be in sympathy with those who are solicitous about the quality of the education afforded our young people and the environment in which they are trained. There is no question apart from the question of personal godliness more vital to the individual and to society than the question of the forces that predominate in life as a result of our training in schools.

The Quality of the State's Education.

Let me remark therefore that there is a different motive

ruling in the state from that which rules in the church so far as educational work is concerned. The state's motive is ethical. The ethics by which the state is moved is, moreover, Christian ethics. There is however, a distinction between Christianity and ethics, and we need not confuse the Christian with the ethical motive. The church engages in the work of education from purely Christian motives. The state is moved by duty—the church by love. The church would not conceal this motive than which nothing can be nobler. I would not have her do so. There need be, however, no conflict between the motives or between the methods of education that proceed from these motives. The difference in motive arises from the difference in fact. The church is of necessity a religious organization. Where they have turned themselves into ethical societies they have failed as churches and have usually lacked the enthusiasm for organizing educational movements except under state control. The state is however, of necessity an ethical state else it cannot maintain its right to existence. Under the sway of Christianity the church is a Christian institution and therefore moved by Christian motives while the state under the like influences is an ethical state moved by ethical motives. The quality of the education may differ and usually does, but ought not to be antagonistic.

The mistake so often made in such questions is very evident. There are those who assume that because they are teaching the Bible they are teaching Christianity and religion and when they are teaching science they are not teaching religion.

The truth is that oftentimes in neither case is much religion taught.

It may be well for us to remember that all true teaching has in it the same spirit. I care not what the subject taught may be, every true teacher in his work looks "not only upon his own things but also upon the things of others." The very act of successful teaching requires that we enlist ourselves in the best interests of our students. That is the working side of essential Christianity. There is a very close parallel so far as the spirit goes between the true teacher and the great teacher sent from God. All true teaching ends in the enlightenment and uplift of the Soul. This is redemptive work of a very noble type. We may write on the doors of our class rooms and proclaim to the world in loudest terms that we are agnostics in religion, doubters in politics and anarchists in society but every time we

meet our classes we deny the record. We there engage in a constructive work that contradicts all our negations. True teaching cannot end in the destruction of faith or life. It is rather faith working by love. The profession of teaching embodies a great host of men and women engaged in essentially the same work in essentially the same spirit. As we realize the scope of the work we shall see that it is not a question of how little we may do or of how few may engage in the work but rather a question of how to multiply the agencies and increase the cooperation among the workers.

From the remarks already made I may now add that the education afforded by the state must so far as its method and spirit be concerned be of the highest ethical character. No defense can be made for a reckless or immoral method or spirit in a state school of any grade. As state universities increase in age the extremists of all parties become less influential and the school recognizes its obligation to maintain a high character. The ethical standards now maintained require no apology.

Is the State's Right or Duty Exclusive?

At this point we may properly inquire whether the state's right or duty in the work of education is exclusive. To this there can be but one reply and that a negative. The right to voluntarily help our neighbor who is in need can scarcely be denied. In the cause of education a large amount of voluntary work has been done. It is perfectly clear also that the state may exercise its right to supervise all educational work so as to insure its character and quality. Whether such a supervision would be either necessary or expedient is a question of fact to be determined from time to time. Individuals have from various motives engaged in the benevolent work by endowing and maintaining schools but the greatest movement has arisen within the church. It is well for us to appreciate the Christian motives that impel the church to this work. I doubt not there have been times when other motives seem to have prevailed but as a general statement we shall find in the last analysis that Christian and beneficient motives lie at the base of all public education under the auspices of the church and of benevolent persons associated for such enterprises. The right to so engage cannot be denied. The motives that prompt to the work may be relied on to prompt to the right kind of work so far as ability would permit. For this reason there never has been any serious doubt about the church's spirit or method in the work of education.

The field of education seems therefore to be fairly and honestly open to both church and state. The extent to which either will engage in the work or the character of the work to be undertaken are not questions to be settled by any *a priori* method. It is purely a question of duty and wisdom to be judged in the light of past experiences and present needs.

Most of us will recall that in the early days people expressed the belief that education in the public schools should be confined to the elementary work. We remember equally well that no one was able to define an elementary education. We are quite sure that the kindergarten, the manual training now so common in many of our cities and much else now taught was not then thought of. About all we can be sure of is that people believed in such an education as fairly well met the conditions under which the people were living. With the new development in modern life and industry all have come to see that if education is what it ought to be it will prepare for life. But life in all its surroundings and in many of its problems has greatly changed. As a result educators are doing what they have always done and always will do—they are trying to make the years of early education a preparation for a larger, fuller and richer life. Under this conception the subjects taught in the elementary and secondary or high schools have multiplied and indeed have been greatly modified. The enlargement of the field of education which has brought to the doors of all our people an opportunity in many respects better than was offered by most colleges fifty years ago has been a great movement in the interest of the people in which there has been a general acquiescence. It would be a hopeless task now to undertake to turn the thought of the people away from this system.

The Extent to which the State shall Engage in the Work of Education.

In the sphere of higher education the problem has been more sharply debated. There have been those who stoutly opposed any higher education at public expense and of course the higher the education the more strenuous the objection. In general this objection has been overruled on the ground that the higher education was necessarily expensive and no one was so well able to bear the burden of expense as the whole people. With the advent of the modern curriculum the argument has been greatly strengthened. The introduction of the modern principle of electives in education has not only increased the expensiveness of a college or university but has added to the argument that the state should

engage in the work. It has become manifest also in the past generation that the progress of civilization has made higher education quite as necessary as the elementary. As a matter of fact and proof there never were so many people pursuing higher education as now. In primitive society with its simpler life higher education was a luxury but with the greater complexity of modern life many luxuries have become our every day necessities and higher education is one of them.

The earlier idea of the college was based upon the fact that it appealed to the few. There was a certain aristocracy about the college bred man and indeed to this day certain eastern colleges find this appeal to aristocracy more effective in certain circles than any appeal to the superiority of educational advantages.

When the state entered the field of higher education it did so with precisely the same motives that prompted the public school—the interest of the people. The state college or university is then democratic in life and method. It is built and maintained by the people for the people. It does not and ought not to appeal to classes of people as such. It comes directly to all the people. It asks no favors and will not grant any. Its aim is to serve the people by holding before them the best ideals and demanding of them in turn the best service.

In entering the field in the middle and newer West the state university found a large field unoccupied or poorly occupied. This was especially true in the departments of agriculture and the mechanic arts—the whole field of technical education and to a considerable degree in the field of general science and professional education. But even here there were many objectors. Men said the state had no business to train men to be tradesmen and mechanics as these things were to be a means of support and profit to them. This objection was strongly urged against professional schools especially those of law, medicine, pharmacy and the like. It was soon seen that the result of such theory if carried into practice would be to rob education of all ordinary utility. Under that theory the concrete could never be taught. The abstract would be our sole delight. Against such theorizing the common sense philosophy of the people steadily prevailed and the cry for a practical education became so persistent that the teachers of the most abstract subjects were soon on the defensive trying to prove the eminently practical value of their instruction. As a net result of the discussion the people saw that no particu-

lar subjects could be prescribed as essential and that but few if any, could be proscribed. As this discussion continued the propriety of the state's effort in higher education became more and more evident, and throughout the West and North-west the state university became a characteristic force in public education.

But we have not yet done with the objections. The fact is not to be overlooked that in the early settlement of our country the church was particularly active in the field of higher education. She established many colleges which served a most useful and honorable part in the development of the new country. As already intimated the motive in much of this work was the purest and noblest. The heroic service rendered in many of these colleges commands our hearty appreciation. But with the advent of the state university some fears were awakened as to the future of these same colleges. It may as well be remarked at this point that occasionally the state institutions conscious that they were the child of the state assumed they were the only children and proceeded to reveal the well known characteristics of such infants. The truth is, they sometimes revealed anything but the proper spirit. On the other hand existing institutions seemed to think that their rights had been invaded. They seemed to assume a kind of preoccupation of the territory that gave them exclusive jurisdiction. The truth is, that both parties have often been wrong. There is not, and ought not to be, any such thing in a free country as an exclusive right to direct the interests of higher education. There is an open question always debatable as to the policy to be pursued. Is it wise for the state, the church or the individual to patronize learning and higher education, and if so, to what extent? What work shall be attempted? These are often very perplexing questions.

A broad, and in my judgment, a truthful view is that the entrance of the state university has been a great good to the cause of education. The presence of the Christian colleges with their ideals and lofty motives has made the character of the state institution better than it would otherwise have been. It is equally true that the presence of the state university with its considerable revenues has been the occasion of increased benevolence upon the part of friends of the private and of the denominational college. May the good work continue! If I were to take Ohio as an illustration I should say that the cause of higher education was never in a more prosperous condition and the last five years have seen the greatest advances ever made by

both state and non-state institutions. The facts would seem to warrant the conclusion that the results in higher education abundantly justify the existence of these institutions. No *a priori* theory can ever settle the questions of popular or higher education. In fact they never will be settled. Education is a process and for that reason alone its problems can never be finally settled. Experience must prove the wisdom of our theories. No line can be arbitrarily drawn to fix the boundaries. The democratic idea that rules in the state university will logically lead it to look to the people and study their needs. It will adapt itself more and more to these needs. It will always feel the pressure of necessity to serve the people—not by listening to the demagogue, nor by following the leadership of unsafe men, but by persistently holding its face to the right and to the light with the uplifted banner of service in full view.

The State University and Other Schools.

I may now speak for a moment of the relation of the state university to other schools. Manifestly the state university is a part of the system of public education. It has no legal or formal relation of this character but it springs from the same and is supported by the same people. In some states the university is provided for by the constitution; in others, as in Ohio, it is the creature of the statute. Naturally therefore its relation to the high schools of a state should be at once inspiring and helpful. The leadership is not one of form or dictation, but no other institution comes into so close a relation to the whole system. The people who provide for and support such an institution have a right to insist, if they will, upon the cooperation of the university with the high school or of the high school with the university. I regard this principle of more importance than any question of standards however important they may be. The university by virtue of its place and opportunity may scarcely justify its existence unless its helpful work shall reach the schools of the state and inspire them to better things. It is operated not simply in the interests of its own students but in the interests of public education. At this point men have not always agreed but as the work of education becomes better understood there will be greater unity. The state schools virtually, if not formally, constitute all there is at present of a public system. The interests of the youth will soon reveal the necessity of a more careful supervision by the state of all the teaching done within its borders. There is no

justification of the presumption that any education is a private enterprise. All true education must look to the good of the people and the welfare of the state. The time will never come in a free country like ours when the state may become arbitrary in these things but the growing public sentiment will increasingly demand that all schools meet the reasonable requirements in the interest of the people. To do this the state without any infringement of rights will see that all education shall recognize certain standards as binding. The state's institutions will need the supervision as well as others. The increasing vigilance of the state in the interests of the people will hold us all to duty. No institution will domineer over others but all alike will respond to the call of an enlightened and cultivated sentiment. The supervision may not be formal but it will be none the less effectual. The state will some day insist on honest and right methods from the kindergarten to the university. It will insist that fraudulent practices may not continue. There is no power so effective in maintaining educational standards as the state. Its own institutions should be the first to respond to this demand. The effect of this supervision will eventually make all educational institutions more public and more vitally related to the state's educational enterprises than they are now conceived to be. They will be more carefully coordinated. They will not be mutually destructive but mutually helpful.

The demand of college education of a high grade if we may judge by the enrollment has greatly increased in the last thirty years. If the demand shall continue to increase it is entirely reasonable to presume that for a still higher education than is now afforded there will be a considerable demand. In this the state will probably lead by reason of the ability to command the resources necessary to carry it on. Even now there is a reason why strictly university work and professional work should be undertaken by the state institutions. They are best able to do so. In following this suggestion the state will both stimulate and complete the work done elsewhere.

The University and the Public.

A word now as to the state university and the public. It may be well to emphasize the fact that the university is the peoples' institution. To such a place we may fittingly come with the statement that public service is a manifest duty. No where else is there a better opportunity to develop typical citizenship. The state university does not often furnish the

opportunity to develop and cultivate particular types of men as other colleges do. It is perhaps well that is so. The democratic ideas that must always prevail in a state university will preserve its spirit of freedom and protect it against the narrowness developed where an aristocratic sentiment rules. The state university must always be the university of the people, and keep its heart close to their needs. More than any other it will be their leader. The importance of a proper public spirit in such schools cannot be over estimated. This spirit will cultivate and maintain a proper respect for law—for authority, and will maintain a proper sentiment upon questions of public morality and public welfare. The best sentiment of our civilization should cluster about the state university—not because the best students matriculate there but because the public joins with the government of the institution in bringing such sentiment to the student body. Our duty in this particular seems clear. It is part of our public service the scope of which cannot be better stated than in the words of the beloved and lamented Dr. Orton in his address to the first graduating class when he said, "It is to public education that we must look for the chief power in welding and unifying the discordant elements of our national life, and of that public education the state university properly expanded and equipped, is the summit and the crown."

One other word and I close. The great purpose of the expenditure of public revenues is to foster and inspire the best in men and women. It is a rational expectation therefore, that these men and women when educated shall catch the best spirit of the university, and be its best friends. It is unnatural that the child forsake the mother and deplorable when the graduates of any institution lose their interest in the college that has helped to make them. There is a sense in which the alumni of a college are the college. They are the best proof of its work. To them we point as the fruit by which we are to be known. But above the duty of loyalty to alma mater I place the duty of educated men to the public. A state university supported by the people has brought to young men and women at great cost the opportunities of an education. The school does infinitely more for the boy than the same boy when he becomes a man can do for the school, but his debt is not to the school so much as to his civilization. The college graduate cannot serve his college better or pay his obligation sooner than by a devoted service to the cause of humanity. Here is the field for which he has been prepared

and the end to which he has been educated. I am disposed to say that the public may of right expect great things of those who have enjoyed the privileges afforded. It is gratifying to know that college men are recognizing this obligation. If our young men and women shall respond to this opportunity with heart and will the justification of higher education will be complete. In the light of what has been done by the public in the interest of education there would seem to be no obligation resting upon the educated young man or woman greater than that of service to his day and generation. This should be, not a drudgery, but a grateful recognition of the common helpfulness of society. We need to learn that what we are other people have helped us to become. Not the least factor in our lives is the university where we have had the time for study, reflection and a true measure of our powers. It is here we have caught most of our ideals that have lifted us into a better world. Shall I make the appeal in vain to-day when I urge upon the alumni and students of the Ohio State University the supreme duty of service? Everything in the past ten years in our history has put renewed emphasis upon the importance of the educated man or woman. He who looks to the future should see a growing opportunity for a noble service. He who makes his college life a preparation for such service hath chosen the better part which shall not be taken away.

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THE O. S. U. NATURALIST

Comparatively little attention has been paid to the Natural History of Ohio, and only to a limited extent have the observations and notes of naturalists and amateurs in Botany, Zoölogy, Geology and Physical Geography of our State, found their way in print. While generous provision has from time to time been made by the State for geological investigations, especially along economic lines, no systematic effort has been supported for other yet equally promising fields of Natural Science.

The Departments in the State University equipped for study and investigation in the various divisions of Natural History, have done some work of the kind here contemplated as available time and opportunity offered, yet no convenient avenue of publication has been at hand.

It is now proposed to issue such a periodical, the Biological Club (composed of instructors and special students in the various sciences) undertaking the publication. While the journal — to be called "The O. S. U. Naturalist"— will be the official organ of the Club, the coöperation will be sought of all University and College professors, High School teachers and pupils, and also amateurs of the State who may be interested in any of the branches of Natural Science.

It is believed that work of the kind contemplated will be of great educational value, and The Naturalist will foster observation and research by students and pupils. The best knowledge to acquire and the best science to cultivate is that pertaining to their own environment.

The O. S. U. Naturalist will be issued monthly during the academic year beginning November 1st and ending June 1st. It will be octavo size, the issues of a variable number of pages, but the first volume will contain 128 or more pages. It will contain general papers (often accompanied with cuts and plates) on the Natural History of Ohio, abstracts of papers read before the Biological Club, notes and observations, and to a limited extent reviews of current scientific literature.

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No. 3

THE GENUS SCAPHOIDEUS

BY

HERBERT OSBORN

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ARTICLE XX.—THE GENUS SCAPHOIDEUS.*

By Prof. Herbert Osborn, Ohio State University, Columbus.

The genus *Scaphoideus* was founded by Uhler in 1889, and made at that time to include the *immistus* of Say, and the newly described species *intricatus*, *jucundus*, and *consors*. During the same year Provancher described *auronitens*, and the number has been further increased by descriptions by Van Duzee and the writer.

As material is in hand for the characterization of several new forms, it seems a suitable time to bring together a short resumé of the species heretofore described, and attempt a synopsis that shall indicate the affinities in the group. Doubtless additional species will come to light, but it is believed that a sufficient number are in hand to give a basis for a natural grouping, and to indicate the character of the fauna in the genus.

The generic characters, as given by Uhler, are "Form of Phlepsius lacerdæ Sigt. Head triangular, flat above, vertex almost as long as the width between the eyes, subacuminate at tip, the base deeply sinuated; front longer than wide, deltoid, with the sides near the tip moderately curved, tylus liguliform; cheeks broad, curved, expanded to behind the middle of the eye, acutely tapering at tip and hardly enclosing the entire lora, the lora diagonal, acute at each end. Antennæ long and slender. Pronotum sublunate, more curved anteriorly than sinuated posteriorly. Wing-covers moderately narrow, longer than the abdomen, curved, valvate, the costal areole long, narrow, destitute of cross veins, followed by a gradually widening cell, beyond this are four apical cells of large size and mostly broad triangular figure; wings with the two apical middle areoles long and narrow, narrowing at base towards the cross-vein. Abdomen moderately long and narrow."

As so defined the genus may include species which approach quite closely to *Deltocephalus*, or, as suggested by

*Contributions from the Department of Zoology and Entomology of the Ohio State University, under the direction of Prof. Herbert Osborn, No. 3.

b Outer claval not strongly hooked at distal end; cross nervure to claval suture indistinct or wanting.
c Outer claval sinuate approaching inner near its middle.
d Light ochreous, ♀ ultimate ventral segment truncate or slightly notched..... .....*ochraceus* Osb.
dd Marked with fuscous, ♀ ultimate ventral segment produced..... .*productus* n. sp.
cc Outer claval nearly straight and parallel to inner, curved at tip.
d ♀ ultimate ventral segment carinate toothed at middle, *carinatus* n. sp.
dd ♀ ultimate ventral segment not carinate or toothed.
e Head and pronotum ivory white or yellowish, *intricatus* Uhl.
ee Head and pronotum with darker areas luteous or fulvous, *luteolus* Van D.
bb Outer claval strongly hooked at distal end usually with distinct cross nervure from outer claval to claval suture.
c No distinct cross vein between claval veins; colors gray or brown marked with fuscous .....*immistus* Say
cc Usually a distinct cross vein between the clavals.
d Outer claval approximating claval suture posteriorly; face black.....*melanotus* n. sp.
dd Outer claval remote from claval suture posteriorly.
e Vertex obtusely angulate; apex of elytra fuscous or black, *obtusus* n. sp.
ee Vertex more produced, sub acute; elytra entirely gray, *cinerosus* n. sp.

SCAPHOIDEUS FASCIATUS n. sp. (Plate X, Fig. 1).

Elytral picture similar to that of *sanctus* and *picturatus*. Face with two conspicuous transverse fuscous bands continued on sides. Length to tip of elytra, ♀ and ♂ 4 mm.

Vertex impressed, rounded in front, the margin obtuse, length three fourths of width, space between eyes and eye on pronotum equal; front at apex equaling base of clypeus; clypeus elongate, scarcely widened at tip; loræ distant from margin of cheeks, oval, the border touching clypeus and front, evenly but slightly convex. Pronotum very convex in front, truncate behind, lateral margins very short. Elytra with narrow appendix, the post-nodal cell widening rather sharply behind.

Color: Vertex white, two dark points near apex and two lighter quadrate or transverse fuscous spots midway from

base to apex. Face white, two marginal bands above and two broad fuscous fascia across, one including antennal pits and continued below eyes across pleural pieces of thorax, the other including apical half of clypeus, lower part of cheeks and continued on anterior coxae. Pronotum white with faint infuscation, scutellum white, basal angles dark; elytra when closed with a common fuscous cruciate mark as in *sanctus*, but the hinder bars extend only to the middle of the disk, from whence a fuscous band runs to the suture at apex of clavus, the entire cross bordered with dark fuscous or black; the white base of the clavus parallels the edge of the scutellum, a white bar crosses the clavus obliquely near tip, and hyaline discal and apical spots are bordered with white; post-nodal and two or three apical cells fuscous. Beneath whitish ventral segments bordered with fuscous, and with a fuscous median line.

Genitalia: ♀ last ventral segment concavely excavated; pygofer and ovipositor short, pygofer embrowned at base. ♂ valve short; plates oval, short, half as long as pygofer, bluntly rounded at apex with a discal brown fascia.

Four specimens from Port au Prince, Haiti, through the kindness of Mr. E. D. Ball. One specimen ♂, Frontera, Mexico (C. H. T. Townsend) is also referred here.

While the material in hand presents differences that have been thought sufficient to separate this form from the *sanctus* Say as referred by Van Duzee, it is possible that additional material may connect them, when the range of the species would cover the Gulf States, Atlantic coast of Mexico, and West Indies. However, the vertex is much more obtuse than in Florida specimens, especially of males, and the size averages much smaller.

Scaphoideus sanctus Say.

Jassus sanctus Say. Jour. Acad. Nat. Sci. Phila., Vol. VI., p. 306 (1831).
Complete writings ed. by Le Conte, Vol. II. p. 383 (1869).
Walker, Homop. Vol. IV. p. 1164 (1852).
Scaphoideus sanctus, Van Duzee. Cat. Trans. Am. Ent. Soc., Vol. XXI., p. 300.

"5. J. sanctus—Hemelytra white, with a common brown cruciate mark. Inhabits Indiana. Body yellowish white;

head sub-acute, with two minute fuscous points near the tip, and an undulated line on the anterior edge; thorax dusky across the middle; hemelytra white, somewhat opalescent, with a common large cruciform mark on the middle composed of brownish spots with blackish edges, and including a whitish common spot; tip with large spots; venter with a dusky band and small lateral spots; feet immaculate. Length to tip of hemelytra nearly one-fifth of an inch." (Say.)

The form which Van Duzee has referred to *sanctus* Say occurs in Florida, Mississippi, and Texas, but I know of no specimens from the latitude of Indiana, the type locality. The specimens which formed the basis of Van Duzee's reference agree in most respects with Say's description, but possess two dark fasciæ across the face, a point not mentioned in Say's description. There are also fuscous annulations on the legs, which would seem to be excluded by the "feet immaculate" of Say's description. On the other hand my *picturatus* occurring nearer the type locality agrees very well in these respects, but has the vertex entirely too prominent and sharp to be called "sub-acute." It seems, therefore, the better plan to follow Van Duzee's reference until sufficient material is available to determine positively that it should be changed. A change, if not supported by future collecting in the type locality of Say's species, would only add greater confusion, which should be avoided if possible.

The specimens of this form in hand, and which include the Florida specimen of Van Duzee's reference, have the head sub-acute with four distinct transverse spots on the vertex behind the transverse impression, and in some there is a trace of a minute pair of apical dots. The band on prothorax is finely transversely irrorate in female, and broken into four oval black spots in the male. The last ventral segment of female is very short, bisinuate, and with an elevated polished black area at middle. The male vertex is slightly more produced, and the genital valve is very small, oval, the plates short and oval with a dark submargin. As compared with the Haitian species, *fasciatus*, the vertex is much more acute, and the marks on head and pronotum more distinct. Specimens from Texas show some tendency to vary between

these forms, and it is possible intergrades may be found in the Mexican fauna.

One specimen from Florida in the Van Duzee collection, three from Texas, collected by Aaron, in collection of Iowa State College, one male from Florida from Prof. H. A. Gossard, and one male from Jacksonville, Fla., from Mr. Heidemann, represent the material in hand.

SCAPHOIDEUS PICTURATUS Osborn (Plate IX, Fig. I)

Scaphoideus picturatus Osb. Proc. Iowa Acad. Sci., V., p. 243 (1898).

Color pattern very similar to *sanctus*. Head more sharply angular, reflexed veins less oblique or indistinct. Length to tips of elytra, female 5 mm., male 4 mm.

Vertex sharply angulate at the tip, as long as width between the eyes, and nearly twice as long at middle as next eye. Front very slightly widening next antennæ, tapering uniformly to base of clypeus; clypeus with sides parallel, base and apex convex; loræ small, suboval; genæ roundingly angulate below the eyes. Pronotum sharply arcuate in front, truncate behind, lateral margin extremely short; scutellum small, the elytra with the post-nodal veinlets irregular, the first either absent or not reflexed, the second strongly reflexed, the middle and inner anteapical cells with distinct or obsolete cross nervures.

Color: Vertex, anterior part of pronotum, scutellum, face, pectus, venter and margin of abdomen above, yellow or greenish-yellow; two minute points next each eye, two short oblique lines near tip, and a very slender median line on vertex, three or four strongly curved arcs on the front, the margins of the olivaceous areas, an oblique band near the tip, and a submarginal border on the elytra, fuscous. The elytra are fusco-olivaceous, interrupted with ivory white as follows; a broad oblique band on the base of corium and clavus paralleling the sides of the scutellum, a discal spot at forking of the first sector, a commisural spot and a broad band across the base of the anteapical cells. The nervures are white on the white portions and also in the fuscous part at apex.

Genitalia: Female, ultimate ventral segment short, slightly notched on the median line; pygofers thickly set towards tip

with rather fine bristles; male, valve small; plates long, tapering gradually to the obtuse tip, exceeding the short pygofers. Both plates and pygofers are finely ciliate with pale hairs.

One female was received from Prof. H. Garman, Lexington, Ky., and one male was collected at Burlington, Iowa, September 5, 1897. Specimens are in hand from St. Louis, Mo., and West Virginia.

I have noted under *sanctus* the possibility that this form, since it comes nearer the type locality and agrees better in some points, may in reality be the form to which Say's description applies.

Scaphoideus auronitens Prov. (Plate X, Fig. 2).

Scaphoideus auronitens Provancher. Petite Faune Canadienne, III, p. 277 (1889)
Van Duzee Catalogue. Trans. Am. Ent. Soc., XXI., p. 301.
Osborn and Ball. Proc. Ia. Acad. Sci., IV., p. 232 (record).

Nodal vein arising from discal cell. Last ventral segment of female deeply cleft. Length to tip of elytra, ♀, 4.50–5 mm; ♂, 4.50 mm.

Vertex slightly wider than long, sub-acute. Front narrowing uniformly, clypeus long, loræ reaching margin of cheeks. Nodal vein arising usually well in front of outer anteapical cell and from the discal cell.

Color light yellow, the vertex and front margin of pronotum with prominent orange red transverse spots. A short transverse line and a broader line parallel to margin on upper margin of vertex, black.

Genitalia: Last ventral segment of female cleft to near its base, each lobe long, rounded at tip; pygofer scarcely exceeded by the ovipositor with short, brown bristles. Male valve small, short, plates elongate triangular, an impressed line parallel to outer margin, and with a long, slender filament finely ciliated reaching far beyond tip of pygofers.

This species was described from Canada, and Van Duzee gives Canada, New York, and Mississippi for its distribution. It occurs abundantly at Ames, Iowa, during July and August, and I have it from Columbus, Ohio. Specimens are also in hand from Washington, D. C. (Heidemann), so that it may be expected to occur generally from Canada to the gulf, and

west to the plains region. It is a well marked species, and apparently subject to very little variation. While in some respects similar to *jucundus*, and apparently referred to by Uhler as a variety of that species, the striking orange marks, the deeply cleft female segment, and the point of origin of the nodal vein make it easily separable.

Scaphoideus jucundus Uhler

(Plate IX, Fig. 2; Plate X, Fig. 3),

Scaphoideus jucundus Uhler. Trans. Md. Acad. Sci., I, p. 34 (1889), Van Duzee, Can. Ent. XXI, p. 11, 1889 (mention).
Van Duzee. Trans. Am. Ent. Soc., XXI, p. 300.

Fulvous, elytra with numerous milky oval spots. Nodal vein arising from the anteapical cell. Length to tip of elytra, ♀, 6–6.25 mm., ♂, 5–5.25 mm.

Vertex flat, slightly depressed, acute, edges thin; front narrowing uniformly to clypeus. Elytra with claval veins but slightly curved apically, and the transverse vein between outer claval and claval suture indistinct.

Color: Head, thorax and elytra rich, tawny yellow, a central line on vertex, on pronotum, and oval spots on elytra, milky white. An obscure line bordering anterior margin of vertex, and a more distinct one bordering the upper margin of front, black.

Genitalia: ♀, last ventral segment longer at middle than at sides, nearly uniformly curved; pygofers short, with scattered brown bristles a little thicker toward the tip. ♂, valve narrow, short; plates slender, acuminate, about half as long as pygofers, with flaccid prolongations which reach about to tip of pygofers.

Uhler does not state locality, but his description was probably from specimens collected in Maryland. Van Duzee gives records for Canada and New York. It was taken abundantly at Ames, Iowa, in August and July. Specimens in hand from the National Museum are marked "St. Agnes," "Sept.," "Oct.," and "Nov.," on "Oak." One from Washington, D. C., Oct. (Heidemann).

The vividly colored variety mentioned by Uhler would seem to correspond with *auronitens* Prov., the different structural characters of which have been noted.

SCAPHOIDEUS CONSORS Uhler. (Plate X, Fig. 4).

Scaphoideus consors Uhler. Trans. Md. Acad. Sci., I, p. 36 (1889), Van Duzee, Catalogue Jassoidea, Trans. Am. Ent. Soc., Vol. XXI, p. 300.

Ochreous brown, marked with white and fuscous. Vertex wider than long, angulate. Length to tip of elytra 5.25–5.75 mm.

Head rather obtusely angulate in front; vertex, length five-sixths of width, front with sides nearly parallel, narrowing sharply to apex; clypeus widening at tip; loræ broad, outer border semi-circular, reaching to or merging with border of cheek. Nodal vein of elytra arising from outer anteapical cell.

Color: "Dull, pale, clay brown inscribed with white and fuscous."

Genitalia: ♀, last ventral segment long, hind margin sinuate, scarcely notched at center, lateral angles rounded; pygofers moderately robust, with light brown bristles scattered over the surface, and more numerous near tip.

Specimens referred to this species are in hand from New York (Southwick), Washington, D. C. (Mally), and from National Museum, "Relay Station, Md.," and "Texas (Belfrage)."

While it is difficult to locate very positive characters, there seems to be, as stated by Van Duzee, sufficient reason to separate it from *scalaris*. However, my material of typical *consors*, or of specimens that would show its affinities with other forms, is too scanty to permit of definite conclusions.

Var. unicolor. n. var. (Plate X, Fig. 5, 5*a*), similar in size and shape to *consors*, but of a dense brown color with markings nearly or entirely obliterated. Face uniform brown, pectus and venter dark brown or fuscous. Ocelli red. Elytra dark brown, nodal vein broadly and densely marked with fuscous. The last ventral segment of female is shorter, more truncate, and the pygofers short, more robust, and bristles confined more to margin and tip. The ♂ valve is large, rather narrow, plates elongate triangular, outer margin slightly convex, the flaccid tips rufous and reaching to beyond tip of pygofers.

One specimen, Berkeley Springs, W. Va., and three, Decatur, Ala., received from Mr. E. D. Ball.

The specimens in hand taken alone might be considered a distinct species, but while there is a decided difference in genitalia from what I conceive to be typical *consors*, the shape of the head, and the probability that absence of markings is due to suffusion of color, makes it seem best to consider it, for the present at least, as a variety.

SCAPHOIDEUS MEXICANUS n. sp. (Plate X, Fig. 6, 6a, 6b.)

Resembles *scalaris*, but with vertex more rounded in front and the genitalia elongate. Length to tip of elytra ♀, 5.25 mm; ♂ 5 mm.

Vertex wider than long, length five-sixths of width, rounded in front, and margins rounded over to cheeks. Front narrow; clypeus elongate and widened at tip; loræ long, reaching almost to margin of cheek. Pronotum wide, twice as wide as long, lateral margin rather short, rounded, hind margin truncate or scarcely emarginate. Clavus with cross veins from the outer vein to claval suture conspicuous, apical ends of the claval veins distinctly bent, nodal vein arising from outer anteapical cell.

Color and markings like *scalaris;* vertex yellow with fuscous lines in front and two rather prominent spots near center, curved light bands less distinct than in *scalaris;* front yellowish with suture and the semi-arcs of front fuscous. Elytra subhyaline with elongate whitish spots on clavus, discal and inner anteapical, which alternate with fuscous fasciæ. Apical cells with fuscous spots and margin.

Genitalia: ♀, last ventral segment long, lateral angles rounded, apex truncate; pygofers long, slender, a few light bristles along the margins, and larger darker ones near the tip. ♂, valve short but distinct, hind border with obtuse process at center; plates narrow, elongate, triangular, outer border straight, reaching about three-fourths the length of the pygofers before becoming flaccid, the flaccid tips extending beyond the tip of pygofer.

Four specimens collected at Orizaba Mex. (H. O.), January, 1892, and one specimen Frontera, Tobasco, Mex. (Townsend).

In shape of vertex this comes nearer *consors*, but in other points it more closely resembles *scalaris*. *Consors*, *scalaris*, this form, and the var. *unicolor* of *consors* form a closely related

group, and very likely may prove to be geographical forms. This may be determined by comparisons of full series of material for the intermediate territory or by breeding, but until so proven it will be more satisfactory to retain their distinctions.

SCAPHOIDEUS SCALARIS VanDuzee. (Plate X, Fig. 7, 7a, 7b).

Scaphoideus scalaris VanDuzee. Entomologica Americana, VI, p. 51, 1890. Catalogue Trans. Am. Ent. Soc., XXI., p. 300. Osborn & Ball. Proc. Iowa Acad. Sci., IV, 232 (Record).

More slender than *consors*, vertex as long or longer than wide, apex prominent, though obtuse at tip. Length to tip of elytra 5 mm.

Vertex long; as long as width, and in some cases one-fifth longer; front narrow, sides nearly straight and parallel; clypeus widening gradually to tip; loræ long, reaching margin of cheek. Pronotum half as long as wide, hind border slightly concave. Cross veins between outer claval and suture obscure.

Color, light testaceous, intricately marked with fuscous, ocelli white.

Genitalia: ♀, last ventral segment long, narrowed toward tip, lateral angles rounded, apex truncate or slightly excised; pygofer rather broad at base. ♂, valve very small or hidden, plates slender, triangular, reaching to middle of pygofers, their flaccid tips ciliate at end and reaching to tip of pygofers.

A very abundant species in Iowa and west to the Pacific coast. Numerous specimens collected at Ames, Iowa, July, August, September and October. One Burlington, Iowa. One Columbus, Ohio; Phoenix, Ariz., May 9, Mex., Pullman, Wash. (from E. D. Ball), California (VanDuzee), Los Angeles, Cal. (Coquillett), Santa Cruz, Cal. (Koebele), Clinic Mts., Ariz. (Hubbard).

While there appear to be some slight variations, I am unable to fix upon any distinctive and permanent character to separate the representatives from Mississippi valley and Pacific region. The specimens from Pullman, Wash., are a little larger, and, perhaps, more brightly marked than the average from Pacific coast, but not more so than many individuals that can be selected either from California or Iowa.

SCAPHOIDEUS LOBATUS VanDuzee. (Plate X, Fix. 8.)

Scaphoideus lobatus VanDuzee. Bul. Buffalo Soc. Nat. Hist, V, No. 4, p. 211 (1894).

Catalogue Trans. Am. Ent. Soc., XXI, p. 300.

Osborn & Ball. Proc. Iowa Acad. Sci., IV, p. 232 (Record).

Light yellow or white, with black spots and lines. Length, ♀, 6 mm.

Vertex considerably wider than long, very obtusely angulated in front, with scattered black, dark spots, the marginal line broken into spots, or forming a curved line on either side. Costal cell with numerous dark cross veinlets.

Genitalia: ♀, last ventral segment long at middle, nearly truncate, very slightly notched. ♂, valve "small, brown; plates narrow, their slender recurved tips brown and fringed with long white hairs."

This species was described from two specimens from Lancaster, N. Y., and two from New York City. It was taken at Ames, Iowa, by Mr. E. D. Ball, August 7, 1897, and August 13, 1897. I have one specimen from Madison, N. J., taken August 6, 1898, and one from Mr. VanDuzee, taken at Gowanda, N. Y., August 18, 1898.

This species occupies a position by itself, and appears to have affinities with either Eutettix or Paramesus. The postnodal cell is narrow, and the presence of cross veinlets in the costal cell are exceptional. However, the shape of vertex and front scarcely permit its reference to a different genus, unless one be created for its reception.

SCAPHOIDEUS OCHRACEUS Osborn. (Plate IX, Fig 3.)

Scaphoideus ochraceus Osborn. Proc. Iowa Acad. Sci., V, p. 242, 1898.

Tawny ochraceous and pallid with most of the elytral nervures fuscous. Length to tip of elytra, ♀ 6 mm., ♂ 5 mm.

Vertex as long as width between the eyes, nearly as long as pronotum, the margin angularly rounded; front, narrow; margins slightly concave next the antennæ, tapering uniformly to base of clypeus, which it equals in width. Clypeus twice as long as width at base, broadening to the apex, which is distinctly truncate; loræ oval, sub-angulate at tips, twice as long as wide; genæ broad, slightly concave below eyes

and sub-angulate on margin, forming a narrow margin below loræ. Elytra with costal veinlets very oblique, as in *immistus*, the first originating at or just in front of the transverse veinlet; the second near the middle of the outer anteapical cell; the third at the end of the anteapical cell, but not touching the apical veinlet. In one specimen an extra oblique vein occurs between first and second. Claval vein curved, no cross vein to suture.

Color: Vertex yellow with a broad ochraceous or ochraceous-rufus band across the disk, the median portion forming a short curve and reaching the width of the band toward the apex, sometimes almost interrupted; pronotum with two large spots on the anterior margin near the middle; the posterior half, except narrow median line, two large lateral spots and a slightly fainter median stripe, a wide border to nearly all the nervures and the apex of elytra, ochraceous; a spot at end of inner claval nerve, a short line at end of outer claval nerve, an elongate spot at end of clavus, a spot in inner discal area, interrupted lines on the nervures most conspicuous on the reflexed veinlets and next the costa and a subapical border, fuscous; the elytral cells whitish hyaline.

Genitalia: ♀, ultimate ventral segment long, the posterior border straight or very slightly produced at the middle. Pygofers full, polished, with marginal and terminal bristles, the latter strong; ♂, valve very short, transverse; plates broad, roundingly narrowing to obtuse tip with weak marginal bristles; pygofers rather broad, extending half their length beyond the plates and set with long, stiff bristles.

Collected at Ames, Iowa, from July 29 to August 13.

Specimens have also been examined from Gowanda, N. Y. (VanDuzee) and western Pennsylvania (Wirtner).

While this species has the general color of *jucundus* it differs from that species very distinctly in the oblique reflexed veinlets, and in having the transverse band on the vertex, instead of the two parallel spots. From *immistus*, *intricatus*, and *luteolus*, which it resembles in venation, it differs in color and size.

SCAPHOIDEUS PRODUCTUS n. sp. (Plate X, Fig. 9, 9 a, 9 b.)

Gray brown, vertex with heavy fuscous crossband produced

at center. Female ventral segment produced. Length: ♀, 6 mm.; ♂, 5.50 mm. to tip of elytra.

Vertex rather acute, its length nearly equal to its width, front with margins slightly sinuous, apex narrowing slightly but abruptly to clypeus, clypeus narrow, widening abruptly at apex; loræ narrower than in *carinatus*, touching margin of cheek. Pronotum lunate, hind border slightly concave. Elytra with claval veins strongly curved at tip, outer anteapical cell pointed, scarcely stylate, usually three recurved veins arising from anterior part of anteapical cell.

Color: Vertex yellowish, a broad fuscous band produced at middle to nearly meet the broken marginal band and shading to light brown posteriorly; face dark above, lighter on lower half; the marginal band, and submarginal arc black, the frontal semi-arcs fuscous and lower part of front lighter, the cheeks under antennæ and the apices of loræ fuscous, as also the sutures; pronotum yellowish, with fuscous lateral patches; elytra whitish or hyaline, with fulvous areas on discal and apical cells, and fuscous patches on clavus inner discal cell, on nodal and apical veins and apical submargin.

Genitalia: ♀, last ventral segment long, produced at middle, lateral angles rounded, pygofers reaching about to tip of ovipositor, with a patch of black bristles near tip and whitish bristles near middle; ♂, valve short; plates broad short, obliquely truncate, flat, lateral margin reflexed, less than half the length of the large pygofers.

Described from seven ♀s and two ♂s of which three females were taken at Ames, Iowa, August 3, 1896, August 7, 1897, and October 14, 1896. One at Sioux City, July 7, 1897. Three ♀s and one ♂ Onaga Kans. (Crevecour) and one ♂ from Kentucky (Garman).

While this species approaches *carinatus* in size and general appearance, it is quite distinct from it in the genitalia, and also differs in the shape and markings on vertex and clavus.

SCAPHOIDEUS CARINATUS n. sp. (Plate X, Fig. 10, 10 a, 10 b.)

Large, light gray, with a heavy cross band on vertex; last ventral segment of female, with a strong carina and projecting tooth. Length: ♀, 6.50 mm. to tip of elytra.

Vertex subangulate. Length, five-sixths of width, one-half longer at middle than next the eye; front narrow, margins nearly straight; clypeus widening at tip; loræ large, broad, scarcely reaching border of cheeks; pronotum a little more than twice as wide as long, the hind border scarcely emarginate; elytra broad, the cross vein between outer claval vein and suture obsolete, first anteapical triangular, pointed behind, scarcely stylate.

Color: Dark gray for head and prothorax, light gray for elytra; vertex with a conspicuous transverse fuscous band projected forward at middle, and a heavy fuscous line parallel to the anterior margin each side; face whitish with fuscous borders to the sutures; pronotum grayish brown with fuscous spots; elytra whitish, with fuscous veins, the nodal and apical broadly bordered, the claval veins at the strong apical curve crossed by a dark dash, the apex fulvous with a broad marginal fuscous border; legs whitish, with anterior femora blackish, and the usual points on posterior tibiæ and tarsi; abdomen whitish, with blackish washes on segments.

Genitalia: Last ventral segment of ♀ broad, with a strong carina on median line produced into a sharp spur beyond the hind margin.

This large and quite distinct species apparently belongs to the eastern part of the country, as of the three specimens, all of which are females; one is from Hanover, N. H. (C. M. Weed); one from New Jersey (C. W. Johnson); and one from Hamburg, N. Y. (E. P. VanDuzee), the last collected July 31, 1898.

Scaphoideus intricatus Uhler.

Scaphoideus intricatus Uhler. Trans. Md. Acad. Sci., I, p. 34, 1889.

VanDuzee Catalogue, Trans. Am. Ent. Soc., XXI, p. 300, 1894.

Osborn and Ball. Proc. Iowa Acad. Sci., IV, 232 (Record).

Vertex scarcely as wide as long, with very faint transverse band and marginal line. Beneath white, except a series of dots on lateral margin of abdomen and a central patch on last ventral segment of female.

♀, last ventral segment truncate; pygofers rather long with small dusky patches near the tip each side, a few small

scattered white bristles, sometimes embrowned; coxæ and pleural pieces sometimes with fuscous spots.

Females of this species are in hand from Ames, Iowa, taken July 30, 1896, "Onaga Kans," received from Mr. E. D. Ball. "Albion, N. Y., August 27, 1898," from Mr. VanDuzee; Columbus, Ohio, October 10, 1898; and West Point, Neb. (Bruner).

Uhler does not describe the male, but specimens which seem to belong here, and one of which has been so placed by Mr. VanDuzee, may be characterized in this connection.

♂, Length to tip of elytra 4 mm. Very light, apparently immature; vertex borders tinged with fulvous; valve short; plates elongate, nearly as long as pygofers; outer margins subangulate, sides somewhat reflexed near base, with long white cilia on margin, and a bunch of black hairs beyond their tip on pygofers.

One specimen, Agricultural College, Michigan, having date August 3, 1892, kindly loaned me by Prof. Pettit, and four specimens from Ames, Iowa, bearing dates in July and August of 1896 and 1897, collected by Mr. E. D. Ball. These specimens have a peculiarly immature look, but agree so exactly that they can hardly be considered as such. Their very small size, as compared with ♀ *intricatus*, raises the question whether they are actually males of this species, but the color and markings agree better here than with any other species and the specimens mentioned by Van Duzee from the Agricultural College, Michigan, may have been taken together.

According to Uhler, *intricatus* occurs on Crataegus bushes from early August to late October in Maryland, Virginia, and New Jersey.

SCAPHOIDEUS LUTEOLUS Van Duzee. (Plate X, Fig. 11, a, b, c.)

Scaphoideus luteolus VanDuzee, Bull. Buffalo Soc. Nat. Hist., Vol. V, p. 210. Catalogue Trans. Am. Ent. Soc., XXI, p. 300.

Osborn & Ball. Proc. Iowa Acad. Sci., IV, p. 232 (Record).

"Form and size of *auronitens*: Length, 4 mm."

Vertex scarcely as long as wide, subangulate at apex, margined with a fine line and with a brown transverse band

between the eyes, which fades out only at hind border of the head.

♀, last ventral segment produced, angles retreating, pygofers long and slender, not reaching the tip of the ovipositor. ♂, valve broad, short; plates large, tapering to a sharp point and reaching about three-fourths the length of the pygofers.

Described from Anglesea, N. J. (Smith), and New York City (Southwick).

Specimens also referred to this species from Ames, Iowa, (Iowa State College collection), and from Urbana, Ill. (McElfresh). While the types which have been in hand for examination and some of the other specimens seem quite distinct, there are others evidently belonging here, which vary toward *immistus*. The male plates, however, seem to furnish a good character. One specimen (Baker collection) is labeled "Willow, September 8."

SCAPHOIDEUS IMMISTUS Say. (Plate IX, Fig. 4; Plate X, Fig. 12.)

Jassus immistus Say. Jour. Acad. Nat. Sci., Phila., VI, p. 306 (1831).

Jassus immistus Harris. Geology of Mass., 2d Ed., p. 580 (1835).

Jassus immistus Walker. Homop., IV, p. 1163 (1852).

Jassus immistus Say. Complete writings edited by Leconte, Vol. II, p. 382 (1869).

Jassus immistus VanDuzee. Canadian Entomologist, XXI, p. 11, (1889).

Scaphoideus immistus Uhler. Trans. Md. Acad. Sci., I, p. 33, (1889).

Scaphoideus immistus Provancher. Pet. Faune. Ent. Can., III, p. 276, (1889).

Scaphoideus immistus VanDuzee. Psyche., V., p. 389 (1890).

Scaphoideus immistus Harrington. Ottawa Naturalist, VI, p. 32, (1892).

Scaphoideus immistus Osborn. Proc. Iowa Acad. Sci., I, Part 2, p. 125, (1892).

Scaphoideus immistus Southwick. Science, XIX, p. 288, (1892).

Scaphoideus immistus VanDuzee. Bull. Buffalo Soc. Nat. Sci., V, p. 190, (1894).

Scaphoideus immistus VanDuzee. (Catalogue) Trans. Am. Ent. Soc., XXI, p. 300, (1894).

Usually light brown or fulvous with fuscous markings.

Length to tip of elytra 5.50–6 mm, ♂ 4.75–5 mm.

Vertex as long as broad, sub-acute, a narrow, unbroken black line on anterior margin, and a transverse brown or fus-

cous band between the eyes with a projecting tooth at center, base and anterior part white or yellowish white. Face white, two black lines on upper part. Pronotum more than twice wider than long, brown with transverse whitish band in front of the middle, often with light median stripe back from this to posterior margin. Elytra cupreous brown with whitish hyaline spots; two to four oblique reflexed veins from outer anteapical cell or tip of discal cell.

Genitalia: ♀, ultimate ventral segment truncate or very slightly produced at center, sometimes barely notched at middle on hind border, black patch covering central part about half way to base; ♂, valve short; plates short, outer margin curved or sub-angular. Widely distributed in United States. Specimens are in hand from Vermont, New York, New Jersey, Pennsylvania, Ohio, Illinois, Iowa, Kansas, Colorado, Michigan, District of Columbia, Alabama, Texas, and California.

This species presents great variability, and many of the variations seem to defy limitation, passing by such insensible grades as to make precise definition impossible. The following forms seem to be fairly well defined, and are characterized as a step toward the designation of limits, which may be possible when food plants and larval characters are known.

Some, indeed, seem so different in size and other characters as to be worthy of specific distinction, but these differences seem to me to be too inconstant to fully warrant other than varietal distinction.

Var. minor, n. var. Length ♀, 5 mm; ♂, 4.25–4.50 mm. Vertex slightly more obtuse than typical *immistus*, face often deeply infuscated. ♀, last ventral segment usually slightly produced, and generally appearing somewhat carinate, due to compression against ovipositor. ♂ plates folded at sides and apparently longer than in typical *immistus*. Ames, Iowa; July and August. Abundant.

Var. major, n. var. Length to tip of elytra, ♀ 7 mm, ♂, 6mm. Vertex with dark fuscous cross band with a liguliform projection at middle, marginal line broad and broken at apex. Face infuscated, especially at sutures. ♀, ultimate ventral segment very slightly produced, pygofers long. ♂ plates broad, scarcely reflexed at sides, sub-angulate at outer mar-

gin, almost truncate at tip, a little more than half the length of pygofers. Ames, Iowa; Urbana, Ill., (McElfresh); West Virginia (Heideman).

This variety, as compared with *minor*, is very different, and it is only as they are compared with typical *immistus* that they can be conceived to have any specific relationship.

Var. incisus n. var. Size of typical *immistus*, but with markings very distinct, and with the last ventral segment of the female distinctly incised at center, and the male plates broad.

SCAPHOIDEUS MELANOTUS n. sp. (Plate X, Fig. 13).

General aspect of *immistus* above, face intensely black, female genital segment strongly produced and notched. Length ♀, to tip of elytra, 5 mm.

Vertex, three fourths as long as wide, anterior margins slightly curved, apex obtuse; front narrow; clypeus long, widening at apex; loræ large, reaching nearly to tip of clypeus, and leaving only a very narrow margin of cheek. Pronotum short, lateral margin short, posterior margin emarginate. Elytra with post-nodal cell very wide behind, two or three very oblique nodal veins, outer claval vein very strong, strongly hooked distally, approximating claval suture, and with the cross vein to suture near base.

Color: Vertex whitish with a rather faint brownish narrow band with darker dot at center, a narrow line parallel to the anterior margin. Face jet black except white point just below apex and on tip of clypeus. Pronotum whitish with large fuscous patch each side, fulvous band broken in front, and fulvous broken band behind. Elytra with marginal lobes on clavus, oblique spots either side of transverse vein, costal and post-nodal cells, white or pale yellowish; claval suture, margin of veins, part of discal anteapical and apical cells, fulvous; base and interlobular spots of clavus, lines on the veins and spots in discal, anteapical, and apical band, dark fuscous or black. Dorsum black with yellow border; below, pectus soiled white with spots on legs, base of abdomen, bands on ventral segments and large spot on last ventral segment, black.

Genitalia: Ultimate ventral segment ♀, long, much produced, notched medially.

Except for very different shape of genital segment this might be considered an extreme melanotic variety of *immistus*, but it is smaller, and the points noted seem so well marked that until intermediate forms are found it must be considered as distinct.

Described from three specimens, all females, two of which are from Texas (U. S. N. M.), and one from Hyattsville, Md., collected by Mr. J. S. Hine, July 9, 1899.

SCAPHOIDEUS OBTUSUS n. sp. (Plate X, Fig. 14).

A broad gray band from pronotum to anteapical cells. Length, ♀, to tip of elytra, 5 mm.

Vertex depressed, obtuse, nearly twice as wide as long, anterior margins curved, minutely carinate; front narrow, sutures converging but slightly till near the tip; clypeus long, slightly enlarging to apex; loræ large, almost reaching tip of clypeus and outer margin of cheek. Pronotum short, lateral margins flaring, posterior margin evenly concave. Elytra, appendix wide; post-nodal cell widening to apex and sharply angular within, post-nodal vein slightly curved and oblique; outer claval vein hooked, remote from suture distally, with distinct cross veins at base to suture and to inner vein.

Color: Head and thorax nearly white or light yellow; vertex cream white with a broad fuscous band between the eyes enlarged at center to form a blunt point before and behind, anterior margin showing a narrow black line; face black, the disk less dense and the frontal arcs not entirely hidden. Pronotum fuscous or black with a milky median cross and posterior border and some fulvous dots on anterior margin; scutellum fuscous with the usual picture in white. Elytra white except lines on the nervures, a basal spot next costa, the anteapical cells and a terminal band, which are fuscous or black. Abdomen below black with white margins. Below, pectus black with white markings, legs white, venter white, black at base and on discs of segments and apex of last ventral segment.

Genitalia: ♀, ultimate ventral segment long, produced in middle, apex rounded. ♂ last ventral segment narrow bordered with black, valve, plates and pygofer broken off.

Described from one ♀ and one ♂ from Ames, Iowa, and two ♀s from Urbana, Ill., collected by Mr. F. M. McElfresh, and kindly sent to me by Mr. E. D. Ball.

This species belongs in the group with melanotus, but is easily separated from that species by the broad gray band and position of the claval vein.

Scaphoideus cinerosus n. sp.

Ashy gray with dark bands or lines on vertex, pronotum and elytra. Resembles obtusus but vertex more acute, and the apical portion of elytra is not fuscous or black. Length, ♀, 4–4.50 mm.

Vertex nearly as long as wide, sub-acute; front tapering uniformly; clypeus widening but slightly at tip; loræ long, reaching margin of cheek. Pronotum longer than the vertex, hind border barely emarginate. Claval veins hooked, outer bent somewhat toward the suture, but not fusing with it, cross veins from suture to outer claval and between the clavals near the base.

Color: Light ashy gray; vertex almost white with a light brown crossband between the eyes, and a fine black line, sometimes obsolete, next the anterior margin; face more or less infuscated, the lower part of cheek usually whitish; clypeus with a whitish disc. Pronotum light gray with dark patches near lateral hind margin and along anterior border, and two light brown spots near the middle of hinder portion. Elytra ashy gray or whitish, veins infuscated, and faint traces of brownish spots on discal, inner anteapical and apical cells.

Genitalia: ♀ last ventral segment longest at middle, rounded slightly carinate on the middle line toward the apex; pygofers long, slender, with a dark spot near the apex, and scattering white bristles on base and disk, and two brushes of black hairs each side near the apex.

Described from specimens collected at Ames, Iowa, by Mr. E. D. Ball, and Urbana, Ill., (F. M. E.)

Explanation of Plates.

Figures 2, 3, 4, of Plate IX, were drawn for the Iowa Experiment Station by Miss Charlotte M. King, and are used here by the kind permission of Prof. H. E. Summers, Entomologist of the Station. All other figures are by the author.

Plate IX.

Fig. 1. *Scaphoideus picturatus* Osb. *a*, imago dorsal view; *b*, face; *c*, elytron; *d*, ♀, *e*, ♂, genitalia, ... p. 193

Fig. 2. *Scaphoideus jucundus* Uh. *a*, imago dorsal view; *b*, face; *c*, vertex and pronotum; *d*, elytron; *e*, ♀, *f*, ♂, genitalia, ... p. 195

Fig 3. *Scaphoideus ochraceus* Osb. *a*, imago dorsal view; *b*, face; *c*, vertex and pronotum; *d*, elytron; *e*, ♀, *f*, ♂, genitalia, ... p. 199

Fig. 4. *Scaphoideus immistus* Say. *a*, dorsal view imago of var. major; *b*, face; *c*, vertex of typical *immistus;* *d*, elytron; *e*, ♀, *f*, ♂, genitalia, ... p. 204

Plate X.

Fig. 1. *Scaphoideus fasciatus* n sp. *a*, vertex and pronotum; *b*, face; *c*, ♂ genitalia, ... p. 190

Fig. 2. *Scaphoideus auronitens* Prov. *a*, elytron; *b*, wing, . . . p. 194

Fig. 3. *Scaphoideus jucundus* Uh. elytron, ... p. 195

Fig. 4. *Scaphoideus consors* Uh. vertex and pronotum; 4 *a*, ♂ genitalia, ... p. 196

Fig. 5. *Scaphoideus consors*, var. unicolor face, *a*, ♀, *b*, ♂ genitalia, ... p. 196

Fig. 6. *Scaphoideus mexicanus* n sp. vertex and pronotum; *a*, ♀, *b*, ♂ genitalia, ... p. 197

Fig. 7. *Scaphoideus scalaris* Van D. vertex and pronotum, *a*, ♀, *b*, ♂ genitalia, ... p. 198

Fig. 8. *Scaphoideus lobatus* Van D. elytron, ... p. 199

Fig 9. *Scaphoideus productus* n sp. vertex and pronotum; *a*, face; *b*, elytron; *c*, ♀ genitalia, ... p. 200

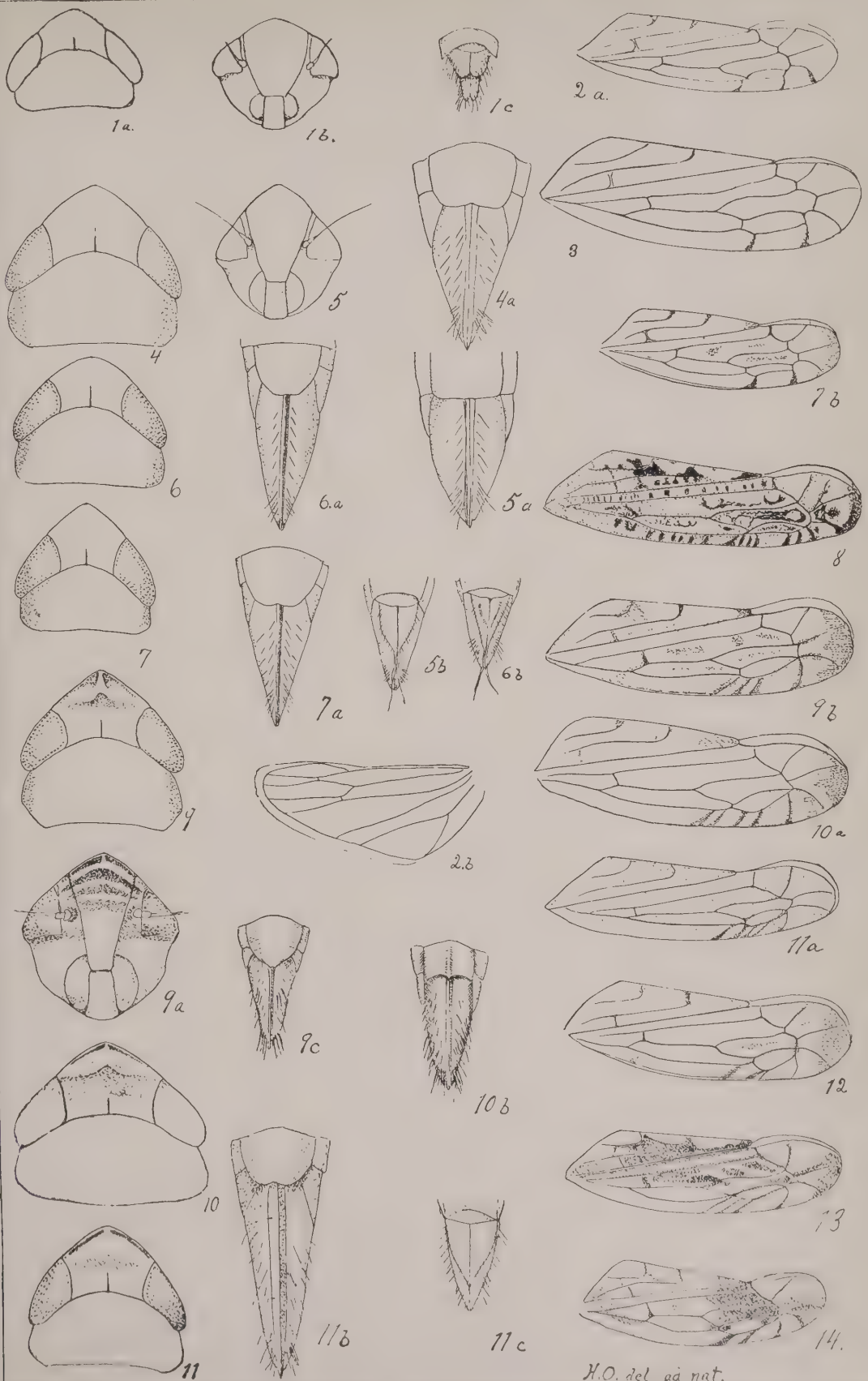
Fig. 10. *Scaphoideus carinatus* n sp. *a*, elytron; b, ♀ genitalia, . p. 201

Fig. 11. *Scaphoideus luteolus* Van D. *a*, elytron; b, ♀, *c*, ♂ genitalia, ... p. 203

Fig. 12. *Scaphoideus immistus* Say. elytron, ... p. 204

Fig. 13. *Scaphoideus melanotus* n sp. elytron, ... p. 206

Fig. 14. *Scaphoideus obtusus* n sp. elytron, ... p. 207



OSBORN, Scaphoideus.

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Ohio State University

LAKE LABORATORY

LOCATED AT

SANDUSKY ON LAKE ERIE.

ANNOUNCEMENT

FOR THE

SUMMER OF 1901.

Entered at the Post-Office at Columbus, Ohio,
as Second Class Matter.

Announcement.

The Lake Laboratory of the Ohio State University was established under the direction of the late Prof. D. S. Kellicott, for the especial purpose of providing opportunity for investigation of the biology of the lake region, and investigations have been carried on each summer since its establishment except for the summer of 1898, when the death of Prof. Kellicott interrupted the work. In 1900 it was determined to add to the original purpose provision for giving certain courses of instruction and to combine work of the departments of botany and zoology. The following statements concerning the plans for the summer of 1901 are made for the benefit of those who may wish to work at the laboratory, either in independent investigations or in connection with the courses of instruction offered.

STAFF.

The staff includes the regular instructors in the departments of Botany, Zoology and Entomology.

HERBERT OSBORN, Prof. of Zoology and Entomology, *Director.*

W. A. KELLERMAN, Prof. of Botany.
JAMES S. HINE, Ass't Prof. of Entomology.
J. H. SCHAFFNER, Ass't Prof. of Botany.
F. L. LANDACRE, Ass't Prof. of Zoology.
HARRIET G. BURR, Ass't in Botany.

Other lecturers or special assistants will be provided as opportunity offers.

LOCATION.

The laboratory is conveniently located close to the waters of Sandusky Bay, which teem with animal and plant life, while extensive marshes, the river, native forest, beach and lake are all within easy reach and furnish unusual opportunities for study of life under varied conditions. Put-in-Bay with the U. S. Fish Hatchery, Kelley's Island with its famous glacial grooves, and other points of great natural interest are easily reached by excursions and will be visited in collecting or special trips. The extensive fishing industry centering at Sandusky, affords special opportunity for study and investigation in ichthyology.

EQUIPMENT.

The laboratory is housed in the former State Hatchery building which has been arranged with tables, dark room, aquaria, etc., and is supplied with microscopes and other apparatus from the university. Boats, collecting apparatus, dredges, seines, etc., are well supplied and special attention will be given to the methods of collecting and field work.

Interior Investigator's Laboratory.

DATE OF OPENING.

The courses of instruction will open July 1st, and run six and eight weeks.

It will be most satisfactory to enter at the beginning of the course, but from the nature of the work it will be possible for a student to enter at any time and profit by the work in progress. Five days each week will be devoted to regular exercises and one day left open for individual or special excursions.

Applications should be made as early as possible, not later than June 10th, even if it is impossible to begin with the opening day. It will be necessary to provide assistance, apparatus and supplies according to number in attendance, and the fees have been placed so low that proper provision is dependent on knowing the number in advance.

OPPORTUNITIES FOR INVESTIGATION.

Following the plan which has been in operation for several years past, the laboratory will be open to properly qualified persons who may desire to engage in investigations of biological problems pertaining to the life of the locality. No fees will be charged and table room, use of ordinary reagents, boats, aquaria, etc., will be supplied subject only to such provisions as may be necessary to make the facilities equally available to all. Each investigator will be expected to furnish his own microscope, cutting instruments, and special apparatus or reagents needed in his investigation unless otherwise arranged.

The laboratory will be open for investigators from June 15th to September 15th. Applications for table room should be made as early as possible, with indication of the time during which space will be desired.

Special inquiries regarding Zoology should be addressed to Prof. Herbert Osborn.

Special inquiries regarding work in Botany should be addressed to Prof. W. A. Kellerman.

Applications and correspondence relating to the laboratory in general should be addressed to the Director,

Prof. Herbert Osborn,
Ohio State University,
Columbus.

Address, June 15th to Sept. 1st,
Lake Laboratory, Sandusky, O.

Interior Student's Laboratory.

University Bulletin. Series V, No. 7.

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CONTRIBUTIONS FROM THE DEPARTMENT OF

ZOOLOGY AND ENTOMOLOGY

No. 4.

A Review of the Panorpidae of America North of Mexico.

BY

JAMES S. HINE

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A REVIEW OF THE PANORPIDAE OF AMERICA NORTH OF MEXICO.*

James S. Hine.

It is a difficult matter to give characters that will define the forms that are at present placed in this Neuropteroid family. The majority of the members are readily distinguished by the beak-like front of the head. The antennae are long, slender, and many jointed ; there are three ocelli or none, and the compound eyes are rather large. Most of the species have four well developed wings but some are wingless or at most have rudimentary wings. The type of the family is *Panorpa communis L.*, the common scorpion fly of Europe, The American species have been catalogued by Banks in Trans. Am. Ent. Soc., Vol. 19, 1892.

The family formerly included the genus *Nemoptera* which Klug considered, but eliminated from the *Panorpidae* in his Monograph of Panorpatae in Abhandlungen der Academie der Wissenschaften zu Berlin in 1836.

The life history of only a few species is known. In Europe Brauer has done some work which is frequently quoted, and in this country Felt has published a paper in Lintner's Tenth Report of the Insects of New York, in which he records observations on some very young stages of *Panorpa rufescens* Rambur.

The material which I have examined in the preparation of this paper aggregates nearly a thousand specimens. Through the kindness of officers in charge I was permitted to examine the material, both domestic and foreign, in the Museum of Comparative Zoology at Cambridge. I desire to express my obligation to Mr. Nathan Banks of the Division of Entomology, Washington, D. C., for suggestions, and the loan of his collec-

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Printed Feb., 1901.

tion which contains specimens, with one exception, of all the North American species of *Panorpa*, and also the officers of the National Museum for the loan of their collection in the family. Dr. E. P. Felt and Mr. C. C. Adams and others have assisted me materially in the loan of specimens. After getting this collection together I find that a large part of North America is represented but more material from our southern states would have been desirable.

The following key is offered for the separation of the genera:

1. Ocelli present 3
   Ocelli absent 2
2. Wings well developed, anntennae short, thick, and narrowed at the apex. Appendages of the male very long, with an articulation near the middle, . *Merope.*
   Wings of female rudimentary, of male imperfect, antennae filiform, ... *Boreus.*
3. End of the abdomen in the male developed into the form of a chelifer, antennae long and filiform, . . 4
   End of the abdomen in the male not developed into the form of a chelifer, abdomen cylindrical, antennae shorter, and gradually decreasing in size towards the tips, *Bittacus.*
4. Tarsal claws toothed, abdominal segments 7 and 8 modified, and elongated, rostrum elengated, . *Panorpa.*
   Tarsal claws simple, abdominal segments 7 and 8 of the male short, similar to the preceding segments, rostrum short, triangular, ... *Panorpodes.*

Panorpa Linn.

The species of this genus have four well developed wings, which in our species are banded or spotted with dark brown. The head is produced downward into a beak, and the mouth parts are borne at at the end. The mandibles are slender and two-toothed at the apex; the antennae are only slightly smaller at the apex than at the base; the legs are rather short, and each tibia bears two strong spines at the apex of its inner surface.

The genus was indicated by Linnaeus about 1767 in his Systema Naturae. Species which at the present time are

placed in at least four distinct genera, were described as belonging to the genus. Gradually as insects have become better classified, *Panorpa* has been restricted to its present limits.

Besides the considerations which Klug gave in his paper referred to above, Westwood has published a monograph of *Panorpa* in the Transactions of the Entomological Society of London for 1846. Hagen gave descriptions of the then known American species in his Synopsis of Neuroptera in 1861. Mc Lachlan, in the Trans. of the Ent. Soc. of London for 1868, considered the European species, and a number of species from Japan. Banks gave a synopsis of American species in the Trans, of the American Ent. Soc. Vol. 22, 1895.

The members of the genus seem to subsist mainly upon animal matter that they find dead, but Davis has recorded in Bulletin 15 of the Arkansas Experiment Station that he has observed a species of *Panorpa* preying upon the cotton worm. Felt has made the interesting statement, that in his experience they paid no attention to living, healthy larvae, but when he placed a living, injured larva in the breeding cage where specimens of *Panorpa* were confined, they immediately set to work sucking juices from the wound. I have observed a specimen feeding on a Dipteron which from appearances was dead before it was attacked by the *Panorpa*.

The characters which have been used in separating the various species are many; formerly the number of teeth on the claws and the size of the horn on the sixth segment of the male were considered of value, but for American forms these appear to be of little consequence. The characters found in the wings have long been used. The wing pictures although variable are certainly of value and the length of the sub-costa, that is, whether it unites with the costa at the pterostigma, or before it, as used by McLachlan in 1868 in connection with European species is of value, but subject to some variation. In the male, the form of the 7th and 8th abdominal segments, the presence or absence of a horn on the sixth segment, and the genital organs are worthy of consideration.

In this paper I consider fifteen species, which seem to fall naturally into five groups. I offer the following key to aid in separating them. The dark colored apex of the wing is considered as a band.

I. Seventh and eighth abdominal segments and forceps of the male much elongated, no horn on sixth segment; subcosta uniting with the costa far before the pterostigma, ... Group *lugubris.*
Wings black with narrow hyaline cross bands, *lugubris.*
Large species, wings yellow with three wide black bands, pterostigmal band not forked behind, *nuptialis.*
Smaller species, pterostigmal band forked behind, *rufa.*

II. No horn on sixth abdominal segment of the male, wings with irregular markings, not usually in the form of bands, ... Group *nebulosa.*

1. Sub-costa uniting with the costa far before the pterostigma, 3.
Sub-costa uniting with the costa at the pterostigma, 2.
2. Large species, pterostigmal band of wing entire, *latipennis.*
Smaller species, rarely with any entire bands on the wings, ... *nebulosa.*
3. Radial vein curves inward to form the pterostigma, *maculosa.*
Radial vein nearly straight at pterostigma, . *banksii.*

III. Horn on sixth segment of the male, wings hyaline, with three entire black bands on the forward pair; from side view a prominent elevation apparent on the basal part of the claws of the male forceps, Group *subfurcata.*
Elevation on the basal part of the claw of the male forceps rounded, about one-half as long as the claw; wings rather narrow, ... *signifer.*
Elevation on the claw of the male forceps oblong, reaching for more than half the length of the claw; wings wider, ... *subfurcata.*

IV. Horn on the sixth segment of the male, wings yellowish with three black bands, basal band rarely interrupted, ... Group *americana.*
Bands on wings regular, wings wide and regularly rounded at the end, ... *americana.*

Bands on wing irregular, wing narrower, . *venosa.*

V. Wings yellowish or hyaline, but not more than two complete black bands, horn on sixth segment of the male abdomen, seventh and eighth segments rather long, about equal in length, seventh rapidly enlarged above just before the middle, . . Group *confusa.*

1. Wings hyaline, posterior border more strongly curved than usual, the veins dark colored, . . *claripennis.*

Wings yellowish, markings confused, pterostigmal band interrupted or geniculated at the middle, uncus short reaching but little beyond the base of claws of forceps, ... *confusa.*

Wings pale, more yellowish at base, uncus reaching to middle of claws of forceps, ... 2

2. Wing markings of usual extent, larger species, *rufescens.*

Wing markings reduced, harpes of male not reaching base of claws of forceps, smaller species, . *canadensis.*

Panorpa lugubris, Swederus.

Plate LIX, Fig. 7.

Panorpa lugubris, *Swederus*, Kongl. Vetensk. Acad. Handl. 8-279; *Klug*, Monog. Panorp. 106; *Westwood*, Trans. Ent. Soc. of London 4-188; *Hagen*, Neuroptera of N. A. 241.

Panorpa scorpio, *Fabr*, Ent. Syst. 2-97; *Rambur*, Neuropt. 331.

Bittacus scorpio, *Latr*, Gen. Crust. Ins. 3-189.

Anterior wing 11–13 mm. Head and thorax black; abdomen in the male brown, except the apical segment which is black; abdomen in the female black ventrally, and at the apex; wings black, anterior pair each with an oblique band on the middle, a costal spot before the pterostigma, one on the posterior margin behind the pterostigma, and one or more between the middle band and the base; hind wings similar, but the oblique band is usually interrupted; there is some variation in the width of the bands, and size of the spots on the wings, but the species is one of the most distinct of the genus.

Specimens are at hand from Ga. and Fla. and Hagen reports it from S. Car.

Panorpa nuptialis Gerst.

Plate LIX, Fig. 2 Plate LXI, Figs. 26, 33.

Panorpa nuptialis, *Gerstaecker*, Stet. Ent. Zeit. 1863, 24-178.

Anterior wing 15–18 mm. Light brown to fuscous, color nearly uniform over the whole body; the front femora, and bases of the middle and hind femora are usually lighter than the remaining parts of the legs, although there is some variation from this, at least in museum specimens. The antennae are uniform fuscous with one or two basal joints lighter; the wings are yellow with the apex, a pterostigmal band, a costal spot of more or less extent, an oblique band and some basal markings black; the basal markings are variable, but are usually found along the borders of the wing; the marking on the posterior border reaches from base to first cross band, the one on costa begins at base, widens abruptly, and terminates before reaching the first cross band. The bands on both wings are straight and well defined, and the basal markings are usually of less extent on the hind wings. The 6th abdominal segment lacks the dorsal horn and the 7th and 8th segments are long and slender. The largest North America species of its genus.

Habitat, Texas, Louisiana and Mississippi.

Panorpa rufa G. R. Gray.

Panorpa rufa, *G. R. Gray*, Griffith's Edit. Cuvier's Anim. King. 15-323, Plate 105, Fig. 2; *Westwood*, Trans. Ent. Soc. of London 4-188; *Walker*, Cat. 461; *Hagen*, Neuropt. N. A. 242.

Panorpa fasciata, *Klug*, (in part) Mon. Panorp. 105.

Expanse according to Westwood 12½ lines, according to Hagen 27 mm. Wings elongate, yellow, sub-acute at apex, two basal spots, an oblique band before the middle, a pterostigmal band forked behind, and apex black. Four minute hyaline spots enclosed in the black apex. Abdomen of the male elongate, segment 6 unarmed—From the description of Westwood.

Habitat, Ga.

I have seen no specimens as yet that answer to this description. It is possible that *nuptialis* may be this species but

the form that I have identified as *nuptialis* averages nearly ten millimeters larger; and of more than twenty specimens before me none have the pterostigmal band forked behind.

Panorpa maculosa Hagen.

Plate LIX, Fig. 6.

Panorpa maculosa, *Hagen*, Neuropt. N. A. 245.

Anterior wing 11–13 mm. Wings hyaline, maculate with numerous small, brown, irregular spots; nearly all the cross veins more or less bordered with brown, first vein uniting with costa near the middle of the wing—far before the pterostigma.

The wing markings in this species are somewhat variable. Some specimens have quite distinct spots, while in others the brown is confined almost entirely to the margins of the cross veins.

Hagen's types, a male and a female, are in the Museum of Comparative Zoology at Cambridge.

Habitat New York; Del.; Ohio; Penn.

Panopa nebulosa Westwood.

Plate LX, Fig. 21.

Panorpa nebulosa, *Westwood*, Trans. Ent. Soc. of London 4-191; *Walker*, Cat. 464; *Hagen*, Neurop. N. A. 243.

Anterior wing 11–13 mm. It is hardly worth while to give a full description of this species; it has the appearance of *maculosa* and the wing markings pass through the same variations as in that species. The difference which I mentioned in the key, namely; in *nebulosa* the sub-costa reaches the pterostigma, while in *maculosa* in ends near the middle of the wing, is the only distinctive character I offer.

Habitat, Mich.; Penn.; N. Y.; Ohio.

Panorpa banksii.

Plate LXI, Fig. 28.

Panorpa affinis, *Banks*, Trans. Am. Ent. Soc. 1895, 22-315.

Anterior wing 11 mm. Fulvous, abdomen luteous; wings hyaline, veins fuscous, a slender apical band and an interrupted pterostigmal one, a middle spot on costa, an interrupted

band, and a basal spot brown ; sub-costa runs into costa at middle of the fore wing; the radius does not curve inward as much at the pterostigma as in *P. maculosa* and the wing is less slender than in that species. Abdomen short, second segment not produced behind ; 6th segment tapering, no projection above ; 7th an 8th sub-equal, 7th ob-conical, curved at base, more swollen above than in *P. maculosa*, 8th more regularly conical and not so large ; 9th short and broad ; forceps stout, appendages reaching to base of claws.

Habitat, Sea Cliff, N. Y. Differs from *P. nebulosa* and *maculosa* in shorter and stouter forms.

I have seen only the type specimen of this species. It is a male and is deposited in the Banks collection.

As *affinis* has been used by Leach for a European species, it seems desirable to change the name of the American species, although *affinis* of Europe is not considered a distinct species at the present time.

Panorpa latipennis n. sp.

Plate LIX, Figs. 1, 3. Plate LXI, Fig. 32.

Anterior wing : male 14 mm., female 16 mm. Brown, last three or four abdominal segments lighter, rostrum and basal segments of the antennae brown, remainder of antennae fuscous; coxae fuscous, remainder of legs pale yellow ; wings hyaline, apex, a pterostigmal band geniculated at the middle, and abruptly widened at costa, a costal spot, a band interrupted at middle, and a basal spot brown. The apical patch of brown is divided or nearly divided by hyaline, the basal spot is absent on the hind wings, all the wing markings are very narrow and somewhat broken, and most of the veins are brown. There, is no horn on the 6th segment of the male. A male and female in the Hubbard and Schwarz Collection taken at Detroit, Michgan, June 2, and a female in the Banks Collection taken in New York.

The large size separates this species from others of its group.

Panorpa subfurcata Westwood.

Plate LXI, Figs. 25, 30.

Panorpa subfurcata, *Westwood*, Trans. Ent. Soc. of London 4-191 ; *Walker*, Cat. 464 ; *Hagen*, Neuropt. N. A. 244.

Anterior wing 14 mm. Brown, antennae black excepting two basal joints which are light brown like the head, the apex of the rostrum is dark, and the tarsal joints are annulate with fuscous; wings hyaline, one or two basal spots, an irregular arcuate band before the middle, a costal spot, a pterostigmal band gradually widened before and interruptedly forked behind. and apex dark brown; the basal spots and band before the middle are usually connected on the anterior wing, and reduced and broken on the posterior wing. Forceps of male, when viewed from the side, with a very prominent elevation which ends anteiorly in a short blunt projection.

Habitat, Nova Scotia; N. Y.; Mich.; New Hamp.; and Hudson's Bay.

Panorpa signifer Banks.

Plate LIX, Fig. 8. Plate LX, Fig. 12.

Panorpa signifer, *Banks*, Trans. Am. Ent. Soc. 26-251.

Anterior wing in the male 12 mm. female 13 mm. Color reddish, mouth parts darker, two basal joints of the antennae pale, the remainder dark brown or black; legs the color of the body excepting the tarsi which are darker, all the joints excepting those uniting femur and tibia with dark annulations; wings hyaline, two basal spots, an irregular band before the middle sometimes interrupted, a costal spot, one behind it on posterior border, a pterostigmal band forked behind and abruptly widened before, and apex enclosing some hyaline spots dark brown; on the hind wings the basal spots are usually absent, the band before the middle may be interrupted, and the forks of the pterostigmal band may be disconnected. The male forceps when viewed from the side show a characteristic obtuse prominence above.

This is a well marked species and specimens are at hand from Michigan, Pennsylvania and New York. The type is in the Banks Collection.

The narrow wing and peculiar prominence on the forceps of the male, serve to identify it readily.

Panorpa americana Swederus.

Plate LIX, Fig. 5.

Panorpa americana, *Swederus*, Kongl. Vetnsk. Acad. Handl. 8-279; *Westwood*, Trans. Ent. Soc. of London 4-189; *Hagen*, Neuropt. N. A. 242.

Panorpa fasciata, *Fabricius*, Ent. Sys. 2-98; *Klug* (in part), Mon. Panorp. 105.

Anterior wing 12 mm. Body brown; wings yellowish; an elongate, basal spot, an oblique band before the middle, a dorsal spot, a pterostigmal band, and apex black. The wing bands are straighter, and much more regular than in any other American species except perhaps *nuptialis*. The form of the wing is striking, being broad and rounded at the apex as shown in the figure. The 6th abdominal segment of the male bears a short horn.

Habitat, Ala.; Ga.

Panorpa venosa Westwood.

Plate LIX, Fig. 4. Plate LX, Figs. 18, 23. Plate LXI, Fig. 38.

Panorpa venosa, *Westwood*, Trans. Ent. Soc. of London 4-190; *Walker*, Cat. 463; *Hagen*, Neuropt. N. A. 242.

Panorpa fasciata, *Klug* (in part)Mon. Panorp. 105.

Anterior wing 11-13 mm. Wings yellow, a basal spot, a band before the middle rarely interrupted, a costal spot, a pterostigmal band widened before, and apex black. Horn on 6th abdominal segment of the male, 7th segment ob-conical increasing gradually in size from near the base, 8th segment usually shorter than the 7th.

This species is easily separated from *americana* by the narrower wings with irregular bands, and from the *confusa* group by the form of the 7th abdominal segment, and also in nearly always having three complete bands on wings.

Habitat, Mich.; New Jersey; Va.; Md.; D. C.; Tenn.; Ohio; Penn.; Ga.; Ill.

Panorpa confusa Westwood.

Plate LX, Fig. 13. Plate LXI, Figs. 27, 34.

Panorpa confusa, *Westwood*, Trans. Ent. Soc. of London 4-190; *Walker*, Cat. 463; *Hagen*, Neurop. N. A. 244.

Anterior wing 12 mm. Fulvous; wings uniform yellowish, a median basal spot with one or two small spots on costa above it, an interrupted band before the middle, a small costal spot, a pterostigmal band geniculated or interrupted at middle, a small spot on posterior border and apex black. Many of the cross veins are margined with fuscous. Uncus of the male short, at most not reaching far beyond the base of forceps.

This species agrees with Westwood's description so well that I feel a certain amount of satisfaction in identifying it as *confusa*. Although most specimens have the ground color of the wings uniformly yellowish there is some variation, and specimens are before me that have these parts hyaline, with the veins dark brown or black. The pterostigmal band is often interrupted and in some cases when it is entire, the posterior part is double.

Habitat, Penn.; N. Y.; Md.; D. C.; Ohio; Mich.; Va.; Ill.; N. C.; Mass.

Panorpa rufescens, Rambur.

Plate LIX, Fig. 10. Plate LX, Figs. 11, 22. Plate LXI, Fig. 31.

Panorpa rufescens, *Rambur*, Neurop. 330; *Felt*, Lintners Tenth Report Ins. N. Y. 464; *Hagen*, Neurop. N. A. 241.

Panorpa debilis, *Westwood*, Trans. Ent. Soc. of Lon. 4-191; *Walker*, Cat. 464; *Hagen*, Neurop. N. A. 243.

Panorpa germanica var., *Walker*, Cat. 459 (?).

Anterior wing 11–13 mm. Wings slightly tinged with yellowish, more apparent at base; a basal spot, a band interrupted before the middle, a costal spot, a pterostigmal band and apex black. Uncus of the male long, unusually reaching to the middle of the claws of the forceps; although, this species has somewhat the appearance of *confusa* at first sight, it is quite distinct; the form as well as the markings of the wings is different as the figures show. The uncus besides being longer, is heavier and much more prominent.

I have compared this species carefully with the original description of Westwood and Rambur. I feel confident now that they pertain to the same species, and this one appears to answer exactly.

There is some variation especially in passing from one sex to the other. The males are considerably smaller and slenderer than the females, and as a usual thing the wings of that sex are paler.

Habitat, N. Y.; Mich.; N. J.; Ohio; Penn.; Ga.; D. C.; Md.; Canada.

Panorpa canadensis Banks.

Plate LX, Fig. 24. Plate LXI, Fig. 39.

Panorpa canadensis, *Banks*, Trans. Amer. Ent. Soc. 1895, 22-315.

Anterior wing 11 mm. Reddish, antennae black, black around the ocelli. Legs and abdomen pale yellowish. Wings hyaline; an apical band broken up on posterior side, a slender geniculate, pterostigmal band, a yellowish costal spot, two spots of a basal band, and a very small basal spot dark brown. Wings a little more slender than in *P. rufescens*, subcosta extending to pterostigma. Abdomen short, second segment not produced behind, 6th segment of the male cylindrical with a stout projection above, 7th and 8th segments sub-equal, 7th with base slender, quite suddenly swollen above, 8th gradually enlarging but not as large as the 7th, 9th short, forceps short, stout, appendages short, not reaching to base of claws.

Habitat, Sherbrooke, Canada and Mt. Washington, N. H.

This species is of the form and appearance of *rufescens*. It is smaller than specimens of that species usually are, and the wing markings are reduced. The type is in the Banks Collection.

Panorpa claripennis n. sp.

Plate LX, Fig. 14. Plate LXI, Fig. 36.

Anterior wing of male 13 mm. General color light brown, darker on notum; apex of tibia and tarsal joints black. antenna black, excepting the two basal joints which are colored like the head; wings hyaline, a very minute basal spot, a band interrup-

ted before the middle. a minute spot in third interspace, an oblique pterostigmal band widened before and behind, some scattered spots, and extreme apex dark brown on the fore wing. Band before middle almost obselete, and pterostigmal band widely interrupted on the hind wings.

The form of the wing in this species is peculiar in that the posterior border is nearly a regular curve from base to apex, making the wing wide near the middle. This is shown in the figure. The type is in the Banks collection.

Habitat, Sherbrooke, Canada.

PANORPODES McLachlan.

The genus *Panorpodes* was founded by McLachlan in the Trans. Ent. Soc. of London, 1875, page 188 for a Japanese insect. The rostrum is short, and triangular; the 7th and 8th abdominal segments are not modified, but of the form of the 6th and previous ones. The tarsal claws are simple, and the wings unicolorous. Only one species has been recognized in North America. I have not been able to procure specimens of this species.

Panorpodes oregonensis McL.

Panorpodes oregonensis, *McLachlan*, Ent. Mo. Mag. 1881, 18-38.

Male very pale yellowish testaceous, the abdomen excepting the apex fuscescent above; ocelli shining blackish; eyes deep black, antennae dusky towards the tips; legs concolorous, the tips of the tibial and tarsal joints slightly blackish; the spinose hairs of tibiae and tarsi few, short and black; puvilli large, rounded, black; maxillary palpi having the 3rd and 4th joints conical not concave within; genae produced downward into a broad triangular tooth on each side of the face below the eyes; mentum with a slight triangular tooth on each side. Cheliferous segment oval, yellowish; claws short and stout, testaceous at the tips. Appendages viewed laterally prominent, thickened and outurned at the tips; viewed in front they consist of a long band-like piece slightly dilated at the apex, which is provided with two out-turned, slightly foliaceous branches;

the whole structure scarcely extending to the base of the claws. Wings wholly very pale shining flavescent, transparent, without markings, the pterostigmal regions slightly darker; neuration very pale; the transverse nervures conspicuously whitish, if the wings be held against the light; subcosta terminating about the middle of the costa in both pairs. (From the description of McLachlan). Female unkonwn.

Length of body 7-8 mm. Expanse 20-24 mm. Habitat, Mt. Hood, northern Oregon. Described from nine males.

Boreus Latr.

The genus *Boreus* was described by Latreille in 1825 in Cuvier's Animal Kingdom. It contains small dark colored, saltatorial insects. Wings of female rudimentary, of male imperfect; no ocelli present in either sex. The females differ from all others of the family in our fauna, in having a long protruding ovipositor, in some cases nearly as long as the abdomen. Only seven or eight species have been recognized.

Hagen has published a treatise of the genus in the Ent. Mon. Mag. 3–132, 1866. In this paper he considered two European species and the two species from eastern United States.

The following key will aid in separating the four species of our fauna:

1. Ovipositor at most little more than half as long as the abdomen, eastern species, ... 2.
   Ovipositor much more than half as long as the abdomen, western species, ... 3.
2. Legs fulvous with a narrow dark colored annulation at each joint, last three joints of tarsi black, *nivoriundus*.
   Legs and ovipositor black, . . . *brumalis*.
3. Legs and ovipositor brown, joints of the legs dark, almost black, base and apex of the ovipositor dark, *californicus*.
   Legs and ovipositor black, unicolorous, . *unicolor*.

Boreus nivoriundus Fitch.

Boreus nivoriundus, *Fitch*, Am. Jour. Agr. 5-277; *Fitch*, Trans. Ent. Soc. of London, 2nd series 1-96; *Hagen*, Neurop. N. A. 240; *Lintner*, 2nd Rep. Ins. N. Y. 237.

Length male 3½ mm., female 4½ mm. Basal joints of the antennae and middle portion of the rostrum fulvous, remainder of head and its appendages black; thorax and abdomen brown, legs, rudimentary wings and genitalia in both sexes light brown approaching fulvous, joints of the legs feebly black, two or three distal tarsal joints black, plate beneath the genitalia of the male triangular, truncate at the apex; female ovipositor about one half as long as the abdomen.

Habitat, N. Y.

Boreus brumalis Fitch.

Boreus brumalis, *Fitch*, Am. Jour. of Agr. 5-278; *Fitch*, Trans. Ent. Soc. of London, 2nd series 1-96; *Hagen*, Neurop. N. A. 240; *Lintner*, Sec. Report Ins. N. Y. 238.

Length, male 2½ mm., female including the ovipositor 4 mm. Black, metallic, all the appendages dark fuscous, ovipositor one half as long as the abdomen, plate beneath the male genitalia emarginate at the apex.

Habitat, N. Y.; D. C.; and Mich.

Boreus californicus Packard.

Boreus californicus, *Packard*, Proc. Bos. Soc. Nat. Hist. 1871, 8-408.

Length of female 5 mm., male 3½ mm. Head, thorax and abdomen metallic black, antennae and base and apex of rostrum black, middle of rostrum piceous, femora and tibiae light brown with the apices black, tarsal joints black, excepting the metatarsals, which are largely light brown; wing pads of the female, and imperfect wings of the male brown. Ovipositor brown, darker at base and apex; plate beneath male genitalia truncate at apex.

Specimens of this species were received from R. W. Doane, who took them at Pullman, Washington, on the snow in midwinter. He says that specimens have been taken in spring and early summer under stones. Packard's types were procured in northern California.

Boreus unicolor n. sp.

Length of female including the ovipositor 5 mm. Entirely black, without the striking metallic luster of *californicus*, and of *brumalis*. The ovipositor is nearly 2 mm. in length, being longer than any other North American species. The large size and long ovipositor separate it from our eastern forms and the black ovipositor and wing pads distinguish it from *californicus*.

Two female specimens in the Hubbard and Schwarz Collection, taken at Helena, Montana, on the 26th of April.

BITTACUS Latreille.

The genus *Bittacus* was described by Latreille in 1807, in Genera Crustaceorum et Insectorum to receive the European species *italica* Müller, *tipularia* Fabricus, which hitherto had been placed in *Panorpa*.

The head is small, and largely occupied by the conspicuous compound eyes. the mandibles are widest at the base, and gradually narrowed distally, the distal end is curved and pointed and preceded by a sharp tooth. The maxillae are peculiar in the large development of the maxillary palpi in comparison with the other parts; the labium is short bearing two-jointed palps at its distal end. The legs are longer than the wings, which are ample and in most cases without conspicuous markings.

Bittacus stigmaterus the first american species was described by Say in the Western Quarterly Reporter, 1823, 2-173. In 1836 Klug published in Abhandl. Acad. Wiss. Berlin, a description of *mexicanus* from Mexico. In 1841 Westwood described *pilicornis*, *punctiger* and *pallidipennis* in Trans. Ent. Soc. of London 4-195-6. In 1853 Walker described *occidentis* in Cat. Brit. Mus. 469. In 1861 Hagen, in his Synop. Neurop. N. A. 246, described *strigosus*, and on page 248 published for the first time, a description of *apicalis* from Uhler's manuscript; In the same work he announces that *pallidipennis* is synonomous with *stigmaterus*. In 1871 McLachlan described *apterus* in the Ent. Mon. Mag. 8-100, and in 1881 *chlorostigma* in the same periodical, 18-36.

The species of the genus differ in their food habits from the members of the genus *Panorpa*, as it is probable that they eat nothing but what they find living. Various insects are eaten by them, and there is no doubt that their predaceous habits make them of some value from an economic standpoint. Thus as they inhabit shady places along streams where mosquitos abound, it seems probable that mosquitoes form part of their bill of fare.

The following key will assist in locating the eight species of our fauna:

1. Both sexes wingless, ... *apterus.*
   Both sexes with wings, ... 2.
2. Hind femora and tibia thickened, cross veins of wings (except *punctiger*) not margined, . . . 3.
   Hind femora slender, cross veins of the wings margined with fuscous, ... 6.
3. Large dark colored species, pterostigma bright yellow, ... *chlorostigma.*
   Smaller species pterostigma not bright yellow, . 4.
4. Wings at base, and hind femora with black punctate spots, ... *punctiger.*
   Wings at apex fuscous, ... *apicalis.*
   Wings and hind femora unmarked, . . . 5.
5. Male appendages not protruding beyond the last segment of the abdomen, rounded at the distal end, *occidentis.*
   Male appendages protruding beyond the last segment, turned inward at apex, . . . *stigmaterus.*
6. Antennae with long pile, wings tastaceous, with the cross veins narrowly margined with fuscous, *piliconnis.*
   Antennae with short pile, wings pale, with the cross veins broadly margined with fuscous, . . *strigosus.*

Bittacus apterus McLachlan.

Plate LX, Fig. 15.

Bittacus apterus, *McLachlan*, Ent. Mo. Mag. 8-100; *Osten Sacken*, Wein. Ent. Zeit. 1-123; *McLachlan*, Ent, Nach. 19-317; *Hine*, Jour. Cal, Hort. Soc. 13-110.

Length of body 22 mm. male and female dark brown; head lighter in color than the thorax, ocelli prominent. not sur-

rounded by black, but the frontal one surmounted by one or two black spines. Thorax brownish, legs lighter, clothed with short pile and numerous black spinose hairs. Apex of tibial and tarsal joints of hind legs piceous, no wings or rudiments of wings.

Appendages of the male pale, wide, rather long, widest at apex, where superiorly there is a prominent elevation; basal part slightly prominent above, but below it is very strongly narrowed. Length 1½mm. Width at middle 1mm.

Easily known by the absence of wings.

Habitat, California.

Living specimens are said to have a green color agreeing with the plants on which they are found. Dry specimens vary some in color and the markings are somewhat obscured.

Bittacus chlorostigma McLachlin.

Plate LXI, Fig. 37.

Bittacus chlorostigma, *McLachlin*, Ent. Mo. Mag. 18-36; Ent. Nach. 19-317; *Hine*, Jour, Col. Hort. Soc. 13-110.

Male and female shining, reddish; wings transparent, shining, veins reddish, pterostigma yellow.

Appendages of the male lighter than the abdomen, extreme apex piceous, superior edge prominent, regularly concave, superior distal angle rounded, apex straight, inferior distal angle rounded, inferior edge very slightly concave to distal third, then strongly convex toward base making the appendage widest near basal third; 2½mm. in length and 1mm. in width. Anterior wing 24-27mm; body 23-26mm.

Habitat, southern Cal.

This is the only North American species of the genus having a yellow pterostigma, and also may be easily known by its large size.

Bittacus punctiger Westwood.

Plate LX, Fig. 19.

Bittacus punctiger, *Westwood*, Trans. Ent. Soc. of London 4-195; *Walker*, Cat. 468; *Hagen*, Neurop. N. A. 247; *Hine*, Jour. Col. Hort. Soc. 13-113.

Anterior wing 18 mm., length of body 17 mm. Yellowish; posterior femora with small black spots, wings yellowish, basal half with a few black spots, cross veins margined with fuscous.

Male appendages, from side view, not protruding beyond the abdomen, widest on basal half, apical part slightly narrower.

This species is easily known by the black spots on the femora and basal half of wing.

I procured specimens in the District of Columbia at intervals between June 25 and Aug. 1st, 1897, and again at the same place in 1899.

The specimens of this species that I saw, always remained close to the ground. If disturbed they never ventured above the herbage in which they were hiding, but flew a short distance through the foliage, and came to rest again near the surface.

Bittacus apicalis Uhler.

Plate LX, Fig. 16.

Bittacus apicalis, *Hagen*, Neurop. N. A. 248; *Hine*, Proc. Col. Hort. Soc. 13-109.

Body 16 mm., anterior wing 15-16 mm. Yellowish; thorax and abdomen often nearly black, wings hyaline black at apex.

Abdominal appendages of the male clothed with rather long yellowish hair; superior edge from side view, obliquely elevated to basal third, remainder regularly concave, superior distal angle a little less than a right angle, distal edge above nearly straight, below obliquely produced, making the inferior distal angle very prominent, the inner surface of this angle is furnished with numerous black teeth, inferior edge convex; a longitudinal thickening traverses the middle of the appendage for three-fourths of its length.

Habitat, Ark., June,; Ill. June,; N.Y.; Ohio, June-July; Va.; W. Va.

Bittacus occidentis Walker.

Plate LXI, Fig. 35.

Bittacus occidentis, *Walker*, Cat. Brit. Mus. 469; *Hagen*, Synop. Neurop. N. A. 247; *Hine*, Jour. Col. Hort. Soc. 13-112.

Length of body 16 mm., anterior wing 20 mm. Light

testaceous, wings yellowish with the veins a little darker, legs usually slightly darker than the abdomen, all of the tibiae black at apex.

Male appendages, as seen from above, reaching the extreme apex of abdomen, oblong, spreading, about the same width for their entire length, rounded, and slightly darker at the tips.

The female is not easily separated from that of *stigmaterus*, but the wings are narrower and usually darker colored. These characters are readily seen by comparing a series of the two species.

Habitat, Del.; D. C.; Ill.; Ind.; Penn.; Can.; Md.

I have examined fifteen males and females of this species. The narrow wings and uniform testaceous color are characteristic; the dark anterior and middle legs in fully matured specimens, is also peculiar to the species. This form has the peculiarity of appearing at lights. In correspondence with A. W. Butler of Brookeville, Ind., I received the following note which I insert with his permission: "About eight o'clock in the evening of Aug. 28, 1896, as I was passing one of the hotels of our city, I was called in to see some queer insects catch flies. I observed that they were very successful in their work, furnishing amusement for the hotel guests and others for a long time."

Hugo Kahl of Lawrence, Kansas, informs me that he took three specimens in his room on the evening of Sept. 25th, 1895.

F. C. Pratt, of the Div. Ent. at Washington, D. C., procured the species at light at Travilah, Md., July 9th, 1899.

Bittacus stigmaterus Say.

Plate LX, Fig. 20.

Bittacus stigmaterns, *Say*, Goodman's West. Quart. Rep. 2-164; Ent. Lec. Ed. 2-173; *Hagen*, Neurop. N. A. 247; *Hine*, Jour. Col. Hort. Soc. 13-114.

Battacus pallidipennis, Westwood; *Westwood*, Trans. Ent. Soc. Lon. 4-195; *Walker*, Cat. 468.

Bittacus mexicanus, Klug; *Hine*, Jour. Col. Hort. Soc. 13-111.

Anterior wing 18-21 mm., body 16-18 mm. Light brown; ocelli surrounded by black, eyes black, rostrum and maxillary palps black, the pile on the antennae is noticably longer than in *occidentis*, veins of wings prominent, hind femora thickened, the outer of the two spines at the end of each hind tibia as long as the first tarsal joint.

Male appendages, from side view, oblong, superior edge strongly elevated at base, nearly straight to apex, inferior edge very gradually approaching the superior, thus making the apex slightly narrower than the base; length of the appendages about 2 mm.

Habitat, D. C.; Ill.; Kans.; Md.; Mo.; N. Y.; Ohio; Ga.

Compared with *occidentis*, the male appendages are entirely different, the pile of the antennae is longer, the veins of the wings are more prominent. and the color of the wings is paler.

In a former paper I separated out a specimen which I called *mexicanus* Klug, principally on account of its larger size. After studying more material I am satisfied that it is *stigmaterus* and that the species is variable in size.

Bittacus pilicornis Westwoord.

Plate LX, Fig. 17.

Bittacus pilicornis, *Westwood*, Trans. Ent. Soc. of Lon. 4-196; *Walker*, Cat. 468; *Hagen*, Neurop. N. A. 246; *Hine*, Jour. Col. Hort. Soc. 13-113.

Anterior wing 19-21 mm., length of body 16-18 mm. Yellowish; antennae clothed with very long pile, wings yellowish, veins darker, cross veins bordered with fuscous, pterostigma prominent, yellowish brown, legs nearly the same color as the wings, hind femora not thickened.

The appendages of the male, from side view, triangular, with the corners rounded.

Haditat, Can.; D. C.; Md.; Mich.; N. Y.; Ohio.

Easily known by the long pile of the antennae. This is one of the two American forms without thickened posterior femora; the corresponding tarsal joints are also slender, and the wings are broad, with the apices broadly rounded.

The species is a strong flyer, and if molested often seeks retreat by flying into trees beyond the reach of collectors. I never have seen it abundant as we often find *strigosus* and *stigmaterus*.

Bittacus strigosus Hagen.

Plate LIX, Fig. 9.

Bittacus strigosus, *Hagen*, Synop. Neurop. N. A. 246; *Felt*, Lintner's 10th Rep. Ins. N. Y. 473; *Hine*, Jour. Col. Hort. Soc. 13-115.

Anterior wing 19 mm., length of body 17 mm. A pale colored species, wings pale, veins darker, cross veins broadly margined with fuscous.

Male appendages, from side view, long, prominent at base, superior edge straight nearly to middle, strongly concave from thence to apex, apex rounded, inferior edge irregularly concave to middle, where there is a prominent projection, nearly straight from thence to base.

Habitatat, Ark.; D. C.; Ill.; Kans.; Mass.; Mo.; N. Y.; Ohio; Pa.

The characteristics of this species, aside from the appendanges of the male, are the broad, pale wings with margined cross veins, and the slender hind femora. It is most nearly related to *pilicornis* from which it may easily be separated by the smaller size, and shorter pile on the antennae. Probably the most abundant and widely distributed *Bittacus* in our fauna.

Merope Newman.

Eyes large, reniform, antennae short, rather thick and pointed at the apex. Legs shorter than the wings, end of the abdomen with very long, two-jointed appendages.

This genus was founded by Newman in the Entomologists' Magazine for 1838, 5-180. Only one species has been described and this is so remarkable that it is questionable as to what family it belongs. Probably it has more characteristics with the *Panorpidae* than with any other group. Westwood after dissecting and studying the mouth parts placed it in this family. Hagen also gave it as his opinion that it should be placed here. Fitch believed that it is most nearly related to insects of the

genus *Nemoptera* which at the present time is not considered in *Panorpidae*. It may be mentioned that two arguments which Dr. Fitch produced against placing it in the *Panorpidae* do not seem so strong since we know more of the family. First, the short beak found in *Merope*, is approached by *Panorpodes*, an insect which is near enough to *Panorpa* to have the abdomen ended by a cheliferous segment. Second, *Merope* was taken in the evening at light; at least one species of *Battacus* has been taken at light several times.

Merope tuber Newman.

Merope tuber, *Newman*, Ent. Mag. 5-180; *Westwood*, Trans. Ent. Soc. Lon. 4-190 Plate 14, Fig. 2; *Fitch*, 14th Rep. Ent. N. Y. St. Agr. Soc. 373.

Expanse 28-32 mm; very pale yellowish; wings with numerous cross veins, each anterior wing with a small tubercle 1½ mm. from base of posterior border.

Appendages of the male long, composed of two sections, each section regularly curved, basal section 5½ mm., apical section 3½ mm., latter widened at apex.

The female has the same appearance as the male, but is smaller and has the end of the abdomen furnished with two appendages which are short, and composed of two segments.

Habitat, Orono, Maine; Penn.; N. Y.; D. C.

I have seen two males and three females.

EXPLANATION OF PLATES.

PLATE LIX.

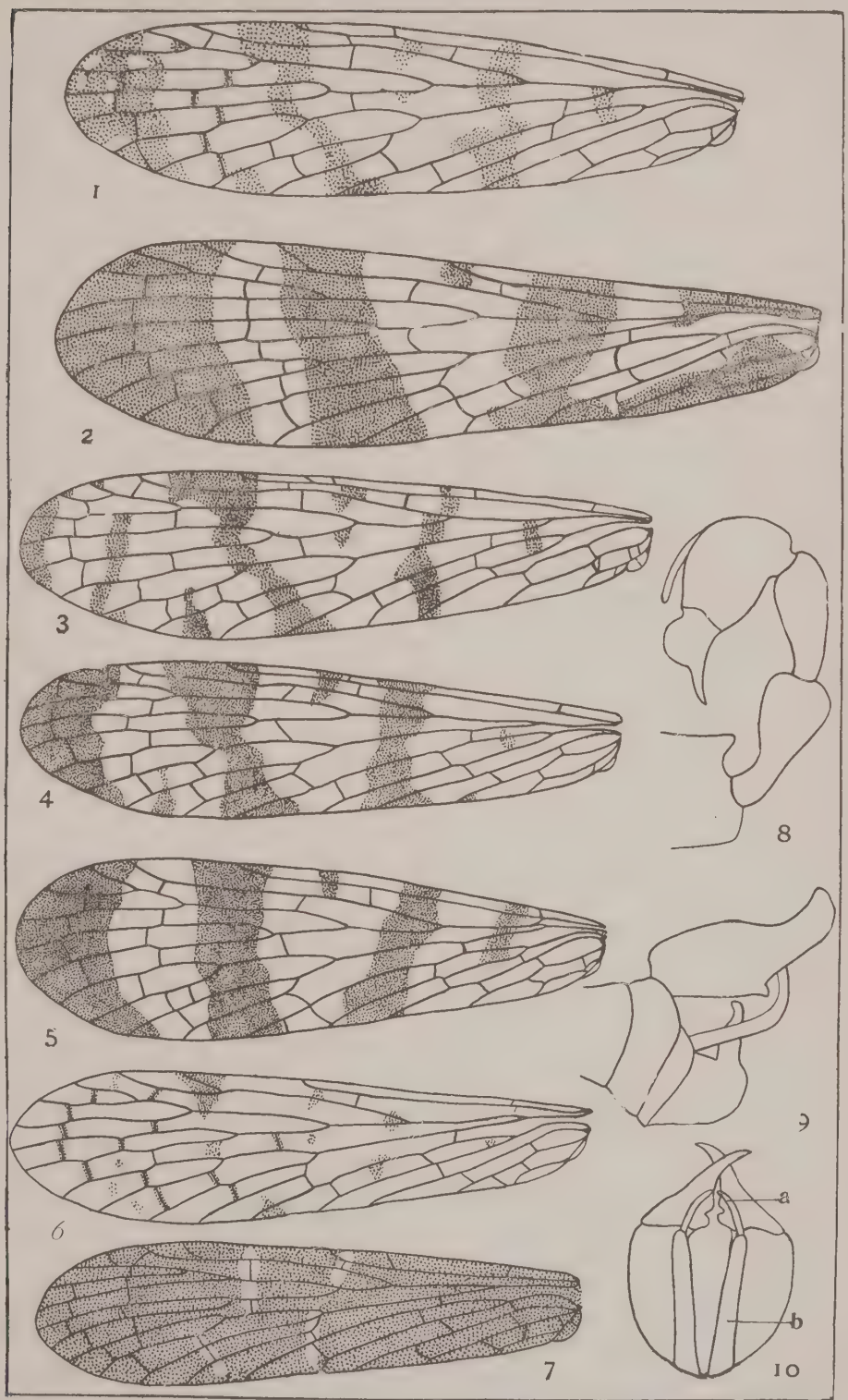
Wing of Panorpa, *1* female latipennis; *2* male nuptialis; *3* male latipennis; *4* male venosa; *5* female americana; *6* male maculosa; *7* male lugubris. Side view of the end of abdomen of male Panorpa, *8* signifer. Side view of end of abdomen of male Bittacus, *9* strigosus. Dorsal view of cheliferous segment of male Panorpa, *10* rufescens, (a) uncus, (b) harpe.

PLATE LX.

Wing of Panorpa, *11* female rufescens; *12* male signifer; *13* male confusa; *14* male claripennis; *21* male nebulosa; *22* male rufescens; *23* male venosa; *24* male canadensis. Side view of end of abdomen of male Bittacus, *15* apterus; *16* apicalis; *17* pilicornis; *19* puntiger; *20* stigmaterus. Dorsal view of cheliferous segment of male Panorpa, *18* venosa.

PLATE LXI.

Wing of Panorpa, *25* male subfurcata; *26* male nuptialis; *27* female confusa; *28* male banksii. Side view of end of abdomen of male Panorpa, *30* subfurcata; *31* rufescens; *32* latipennis; *36* claripennis; *38* venosa; *39* canadensis. Dorsal view of cheliferous segment of male Panorpa, *33* nuptialis; *34* confusa. Dorsal view of abdominal appendages of male Bittacus, *35* occidentis. Side view of the abdominal appendages of male Bittacus, *37* chlorostigma.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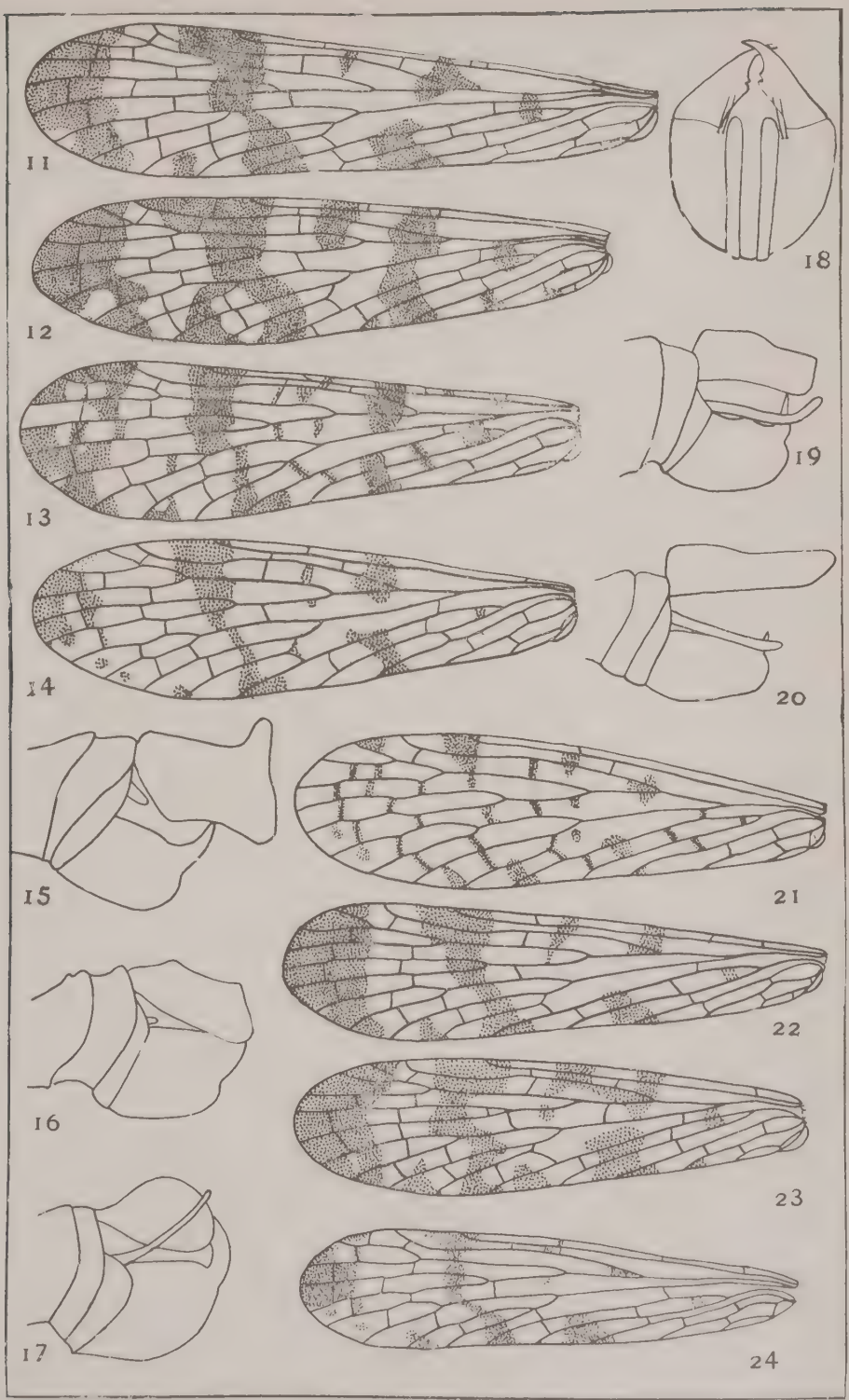
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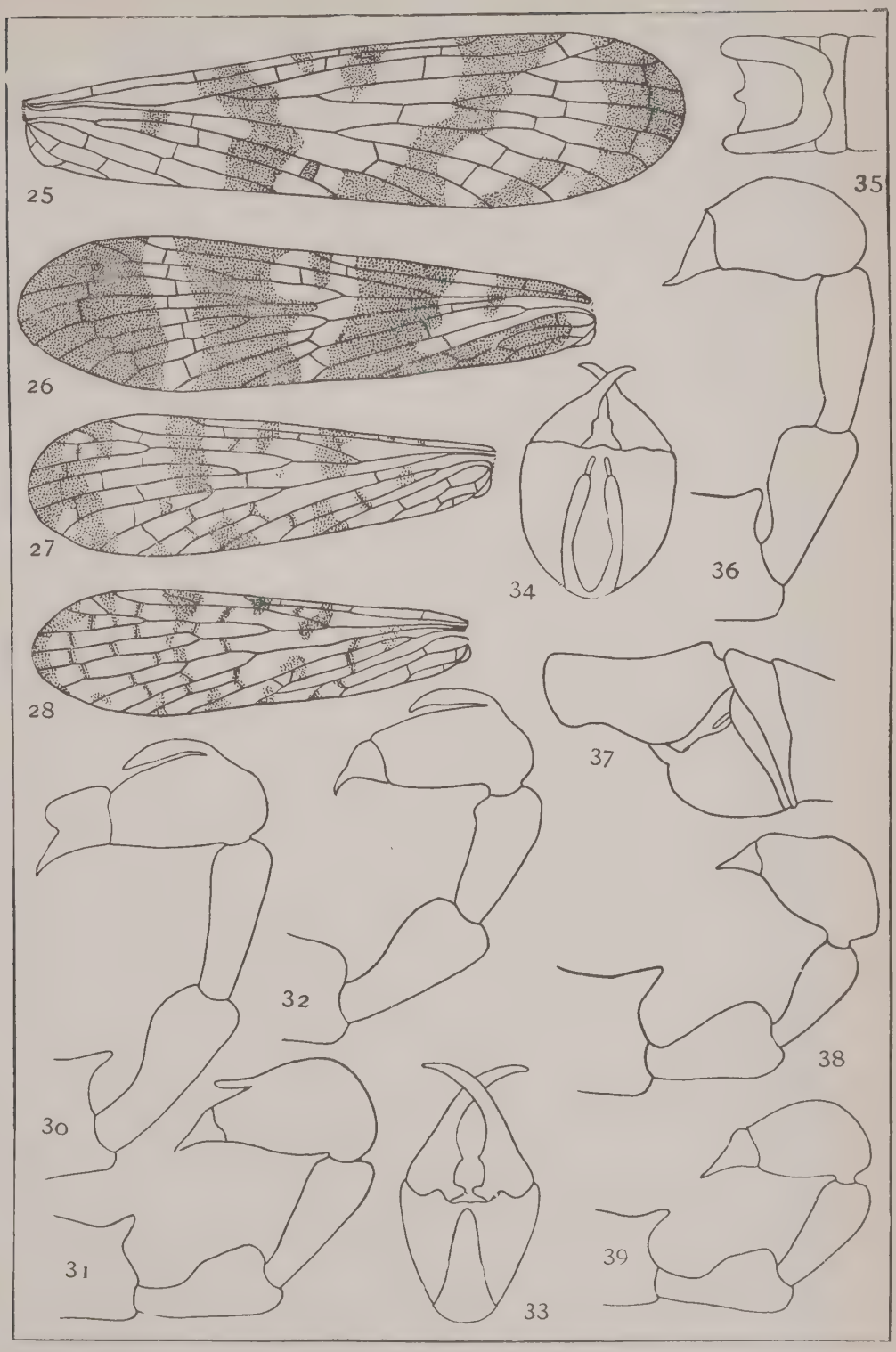
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NAMES FOR THE FORMATIONS OF THE OHIO COAL-MEASURES.

By CHARLES S. PROSSER.

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Art. XV.—*Names for the formations of the Ohio Coal-measures;** by Charles S. Prosser.

Field work during the past three years has acquainted the writer with the formations composing the Coal-measures of southwestern Pennsylvania, Maryland and northern West Virginia. It was, therefore, quite natural in reviewing the classification of the Ohio formations that those of the Coal-measures should be among the first to be considered.

The Ohio Geological Reports contain a wealth of statements regarding the details of the formations and some that are conflicting. The writer makes no claim to have harmonized these various differences, but he has acquainted himself with the general nature and limits of the formations, so that he is able to compare the Ohio classification with that of the Appalachian.

Without attempting to trace the complete development, the more important features of the classification of the Appalachian Coal-measures may be briefly summarized.

Henry D. Rogers, in the final report of the First Geological Survey of Pennsylvania, proposed and defined the following divisions of the coal strata, or Seral series as he termed them, which are arranged in descending order:

Upper Barren Coal-shales.
Upper Productive Coal-measures.
Lower Barren Coal-shales.
Lower Productive Coal-measures.
Seral conglomerate (or lowest division of the Coal-measures.)†

Under the description of the divisions the names are slightly modified and there is a lack of uniformity in the wording in the several places in which the names occur, but the following, omitting the conglomerate, is an approximation:

Newer Coal-shales or Upper Barren group.
Upper or Newer Coal-measures.
Older Coal-shales or Lower Barren group.
Older or Lower Coal-measures.‡

The Lower Barren group was defined as having "for its inferior limit the top of the Upper Freeport coal, and for its superior boundary the bottom of the great Pittsburg bed."§ This also fixed the top of the Lower Coal-measures, the base

* Presented to the tenth meeting of the Ohio State Academy of Science, Columbus, December 27, 1900.

† Geology Pennsylvania, vol. i, 1858, p. 109.

‡ Ibid., vol. ii, pt. 1, pp. 16–20. § Ibid., p. 19.

of which was not so sharply defined, although it was stated in general that it rested directly on the conglomerate; but in the anthracite region, where the two are closely united, Prof. Rogers reported that "considerations of convenience dictate that we place an arbitrary boundary at the bottom of the first or lowest considerable coal-seam."* The Upper or Newer Coal-measures were defined as extending "from the bottom of the Pittsburg coal to the top of the Waynesburg seam,"† and the Upper Barren group contained the remainder of the coal rocks which were found in the southwestern corner of the state.

From this classification has come the one in general use, which is stated as follows, by Dana, in the last edition of his Manual:

Upper Barren Measures.
Upper Productive Measures.
Lower Barren Measures.
Lower Productive Measures.‡

In 1872 Prof. Stevenson described the Coal-measure formations as shown in Monongalia and Marion counties, West Virginia, stating that he "thought it best to adopt the terms used in the Geology of Pennsylvania and the Virginia Reports, for, though they may not have been based on scientific grounds, they are most convenient for description, as the rocks are here developed."§ Under the descriptions of the formations, or groups as they were termed, names derived from geographical terms were used as synonyms for the Lower and Upper Coal groups, the limits of which differed somewhat from those fixed by Rogers.

The Lower Coal group or Allegheny river series extended from "the Great Conglomerate" to the top of the Mahoning sandstone.‖ The base of the formation was drawn at a lower horizon than has generally been the case in later classifications, for it included the Tionesta sandstone and coal (Coals Nos. 18 and 20 of the section), while the higher coal (No. 14 of the section) was correlated with the Brookville, which later has come to be regarded as very near the base of the Allegheny formation. The upper limit of the formation at the top of the Mahoning sandstone also differed from that of the Lower Coal-measures of Rogers, which was drawn at the top of the Upper Freeport coal at the base of the Mahoning sandstone.

The Upper Coal group or Monongahela river series extended from the base of the fire clay immediately underlying the Pittsburg coal to the top of the Waynesburg sandstone, which was given as from 31 to 55 feet above the top of the Waynesburg coal,¶ while the Upper Coal-measures of Rogers extended

* Geology Pennsylvania, vol. i, 1858, p. 17. † Ibid., p. 19.
‡ Manual of Geology, 4th ed., 1895, p. 648.
§ Trans. Am. Phil. Soc. Philadelphia, 2d Ser., vol. xv, p. 16.
‖ Ibid., pp. 27–30. ¶ Ibid., p. 17.

from the base of the Pittsburg to the top of the Waynesburg coal.

When the Second Geological Survey of Pennsylvania was organized Mr. Franklin Platt was engaged as Assistant Geologist to describe the bituminous coal fields of western Pennsylvania, and, as a result of his field work in 1874, the following year he published a table of Paleozoic formations in which geographical names were used for those of the Coal-measures with the exception of the Upper Barren Measures. The names of the formations under consideration are as follows:

Upper Barren Measures.

Monongahela	M. Brownsville (Washington) coal. L. Waynesburg coal. K. Sewickley coal. J. Redstone coal. I. Pittsburg coal.
Conemaugh	Middle Barren Measures. Mahoning sandstone.
Allegheny	E. Upper Freeport coal. Freeport limestone. D. Lower Freeport coal. Freeport sandstone. C. Kittanning coal. B′ Ferriferous coal. Ferriferous limestone. B. Clarion coal. A. Brookville coal.

Conglomerate No. XII, (Seral).*

It will be seen from the above that the Allegheny formation extended from the base of the Brookville coal to the top of the Upper Freeport coal; the Conemaugh formation from the last mentioned horizon to the base of the Pittsburg coal, and the limits of the Monongahela formation differed from those of the Upper Coal-measures of Rogers in that they extended from the base of the Pittsburg coal to the top of the Washington coal, or the one succeeding the Waynesburg coal. The important point in connection with this classification is that geographical names were used for the three formations which compose the Coal-measures proper of Pennsylvania, and the terms based upon the presence or absence of valuable beds of coal abandoned, so that the classification was brought into harmony with the names used for the older Paleozoic formations. Modifications of this classification were published later by Pratt† and in 1877 he used the name Monongahela

* Second Geol. Surv. Penna., H, 1875, p. 8.

† Ibid., L, 1876, pp. 12, 17, 23; and H^2, 1877, pp. xxiii, xxiv.

River system to cover all the rocks from the highest Upper Barren Measures to the base of the Upper Productive Coal Measures, while those included between the horizon last mentioned and the top of the Pottsville conglomerate were called the Allegheny River system.

Lesley also in the same year divided the Carboniferous system into first the *Monongahela River Coal Series*, which included the rocks from the highest of the Upper Barren Measures to the base of the Upper Productive Coal-measures, and second the *Allegheny River Coal Series*, which apparently comprised all the rocks from the top of the Lower Barren Measures to the base of the Pocono sandstone.*

In some respects these modified classifications appear less desirable than the original one and, according to the practice of the U. S. Geological Survey which is now quite generally followed by American geologists, the names Monongahela and Allegheny having already been used for divisions of smaller rank, were not available as names for these two divisions.

In 1876 Prof. Stevenson divided the Upper Barren series into two groups, the upper one termed the Greene County group, which included all the rocks above the Upper Washington limestone; and the lower one, named the Washington County group, which extended from the top of the Washington limestone to the top of the Waynesburg sandstone, an horizon some 80 feet above the Waynesburg main coal.†

Professors Fontaine and I. C. White carefully studied the flora of the Upper Barren Measures and reached the conclusion that the "Upper Barrens of the Appalachian coal field are of Permian age."‡

In 1891 Dr. I. C. White published his excellent work on the "Stratigraphy of the bituminous coal fields of Pennsylvania, Ohio and West Virginia," in which he named the Upper Barren Measures the Dunkard Creek series,§ stating that "the rocks of this series . . . . . begin with the roof shales of the Waynesburg coal and extend upward to the topmost beds of the Appalachian region."‖

In 1896 Messrs. N. H. Darton and Joseph A. Taff published a description of the geological formations of the Piedmont folio, covering the southern part of the extreme western portion of Maryland and a larger area to the south of the North Branch of the Potomac river in the northern part of West Virginia. They gave new names to the Coal-measure formations derived from geographic names occurring in the Piedmont quadrangle, and in general the formations were not separated as they were

* Second Geol. Surv. Penna., H³, 1877, p. xxiii. † Ibid., K, p. 35.
‡ Ibid., Report PP, 1880, p. 119.
§ Bull. U. S. Geol. Surv., No. 65, p. 19. ‖ Ibid., p. 20.

in the earlier classifications. Their list of names, beginning with the Conglomerate, is as follows:

1. The *Blackwater sandstone*, which represented the Pottsville conglomerate.

2. The *Savage formation*, which extended from the top of the Blackwater sandstone or conglomerate to the top of the Davis or Lower Kittanning coal and included nearly the lower half of the Allegheny formation.

3. The *Bayard formation*, which extended from the top of the Davis coal to the top of the sandstone overlying the Fourfoot or Barton coal. This formation contained the upper half of the Allegheny and the lower part of the Conemaugh formation.

4. The *Fairfax formation*, which continued from the top of the Bayard formation to the base of the Elkgarden or Pittsburg coal and contained the remainder of the Conemaugh formation.

5. The *Elkgarden formation*, which contained the rocks above the base of the Pittsburg coal, all of which, with perhaps the exception of the highest, were in the Monongahela formation.*

Upon the organization of the Geological Survey of Ohio by Dr. Newberry a thorough study of the coal deposits of the state was undertaken and to the second report he contributed a "Sketch of the Structure of the Lower Coal Measures in Northeastern Ohio."† Dr. Newberry stated that "North of the National Road we have in Ohio, below the Barren Measures, from six to eight workable seams of coal, forming what is known as the lower coal series."‡ Beginning with the lowest seam, which was called Coal No. 1, they were described and given numbers, the highest one being Coal No. 7,§ which was stated to be "the highest workable seam of coal in Ohio below the Pittsburg bed. . . . . It is overlaid by the great mass of colored shales which form the Barren Coal Measures."‖

At a later date all the names proposed by Prof. Rogers for the Coal-measure formations of Pennsylvania were adopted for those of Ohio, as shown by a "Vertical section of the rocks of Ohio" published in 1873, on which the Coal-measures are composed of the following formations:

"Upper Coal Measures
Barren Measures } 1200 ft."¶
Lower Coal Measures

*Geologic Atlas of the United States; Folio 28, pp. 3, 4, 6 and "Columnar Section."

†Geol. Surv. Ohio. Report Progress in 1870, 1871, p. 14.

‡Ibid., p. 26. §Ibid., pp. 26–44. ‖Ibid., p. 43.

¶Rept. Geol. Surv. Ohio, vol. i, pt. i, facing p. 89.

In the report which followed, Dr. Newberry gave a detailed account of the Carboniferous system of Ohio as then known, and to the list of formations of the former section he added the Upper Barren Measures with a thickness of 300 feet (?) and continued the numbering of the principal coal seams as far as 13 inclusive, of which No. 1 indicated the lowest coal.* In this classification, however, the base of the Lower Coal-measures was carried considerably lower than in Pennsylvania, so that the division contained a considerable part of Rogers' Seral Conglomerate, Coals Nos. 1, 2 and 3 belonging in the Conglomerate.

In 1884 the volume on Economic Geology appeared, containing Dr. Orton's exhaustive account of the Lower Coal-measures of Ohio. The classification of Rogers is quoted and explained,† but the greater part of the Conglomerate was included in the Lower Coal-measures, since this formation began with the lowest coal seam, as was the case in the earlier classification of Newberry. Dr. Orton stated that "In point of fact, there is no more marked separation between the highest coal seam of the Conglomerate series and the lowest of the Productive Measures than can be found between two coals of the latter subdivision."‡ It was shown, however, that Coal No. 4 of Newberry, occurring just below the Putnam Hill limestone, was probably equivalent to the Brookville Coal of Pennsylvania, which in that state occurs at about the base of the Lower Productive Measures or Allegheny formation.§

In 1888 the complete Rogers' classification of Pennsylvania, however, was adopted, as is shown in the following table:

"Upper Barren Coal Measures	500 feet
Upper Productive Coal Measures	200 feet
Lower Barren Coal Measures	500 feet
Lower Productive Coal Measures	250 feet
Conglomerate Group	250 feet"‖

Regarding the change in the classification for the two lower divisions from that of the preceding report, is the following explanation: "In the review in Vol. V, the Conglomerate series of Pennsylvania was included with the Lower Coal Measures, though the boundaries of each were shown to be clearly recognizable here. There are, however, less imperative grounds for the separation in Ohio than in Pennsylvania and

* Rept. Geol. Surv. Ohio, vol. ii, pt. i, 1874, "Section of the Carboniferous rocks of Ohio," facing p. 81.

† Rept. Geol. Surv., vol. v, pp. 1, 2.

‡ Ibid., p. 10. §Ibid., pp. 160, 230.

‖ Ibid., vol. vi, p. 3; see also "Vertical section of the rocks of Ohio," facing p. 4.

the Virginias, and if only the Ohio series were to be classified, it is not probable that the divisions would have been made. But they stand for great and conspicuous facts elsewhere, and it probably would have been better to have maintained them in our territory also. The separation will be recognized in this review."*

The same classification was used by Dr. Orton in his last report of the Ohio Survey,† which also contained a chapter on "The Coal Fields of Ohio" in which he described the coal seams of the Conglomerate Coal-measures, the Lower Coal-measures and the Upper Productive Measures.‡

The Maryland Geological Survey has carefully considered the Carboniferous formations and adopted the classification shown in the following table, which gives the approximate thickness and composition of the formations as exposed in Georges Creek valley in the western part of Allegany county:

Georges Creek, Md., Section of the Coal-measures and Permian.

Dunkard 400′.	400′	Mainly argillaceous shales, some thin limestones and sandstones and an occasional thin layer of coal.
Monongahela 250′.	2′—	Waynesburg (Koontz) coal.
	116′±	Shales and limestones.
	6′	Sewickley (Tyson) coal and shale.
	100′— 115′	Mainly argillaceous shales.
	14′±	Pittsburg (Elkgarden) or "Fourteen-foot" coal.
Conemaugh About 650′.	144′	Black and gray shales and thin sandstones.
	9′	Franklin (Dirty nine-foot) coal, partly shale.
	72′	Shales and sandstones.
	1′	About one foot of coal.

* Ibid., p. 43.
† Ibid., vol. vii, 1893, pp. 4, 36, 37 and "Geological Scale of Ohio" facing p. 4.
‡ Ibid., pp. 255–291.

Conemaugh About 650′.	187′	Sandy and bituminous shales and sandstones.
	4′	Barton (Four-foot) coal.
	112′	Shales, fire-clay and thin bedded sandstone.
	32′	Partly sandstone, (Upper Mahoning sandstone.)
	2′—	Mahoning coal.
	85′	Massive sandstone alternating with shales. Mahoning sandstone.
Allegheny 300′.	2′—3′	Upper Freeport (Thomas) coal.
	11′	Fire clay and shales.
	1′	Coal
	99′	Shales and sandstones.
	1¼′	Upper Kittanning (?) coal.
	55′	Shales and sandstones.
	6′	Lower Kittanning or Davis (Six-foot) coal.
	30′	Shales and sandstones.
	4′	Split Six-foot coal.
	96′	Fire clay, shales and thin bedded sandstones. In part of the field there is the massive Homewood or Piedmont sandstone at top of the Pottsville conglomerate.*

In Jennings and Braddock runs and on Dans Mountain there are two beds of coal near the base of the Allegheny formation which apparently do not occur in the lower part of Georges Creek valley in the vicinity of Westernport and Piedmont.

The section of the lower part of the Allegheny for this part of the field is approximately as follows:

* A more detailed account of these formations may be found in the report by the Maryland Geological Survey on Allegany County, 1900, pp. 115–130, 166–180.

2′—2½′	Clarion (Parker) coal.
36′	Thin sandstones at top with drab argillaceous shales below. In some localities there is a coal seam 18′ above the Bluebaugh coal.
2½′—7′	Brookville (Bluebaugh) coal. In the thickest deposit 16″ of shale occurs, 1′ below the top of the coal.
10′±	Homewood sandstone.*

The Maryland Geological Survey fully accepted the modern ruling that the name of a formation should refer to some locality at which the rocks are well exposed. For this reason the time-honored names of Rogers as Lower Productive Measures, etc., which referred to the presence or absence of workable seams of coal, were abandoned, and the names Allegheny, Conemaugh, Monongahela and Dunkard were adopted. With the exception of Dunkard these are the oldest names, derived from geographical terms, proposed for the formations. In regard to the Upper Barren Measures it was thought better to consider them as one formation, hence the name Dunkard of Dr. White, dropping the words "Creek series" as he originally published it, was used instead of the two earlier terms of Prof. Stevenson.

The names proposed by Messrs Darton and Taff were not used because it was considered that the Rogers-Platt classification, which also had priority, was a more satisfactory one.

In our review of the Coal-measure formations of Ohio we have shown that in the final classification their limits correspond to those of Pennsylvania, and, therefore, it is proposed that the names recently adopted for them by the Maryland Geological Survey be used for the same formations in Ohio. This will involve the following changes in the nomenclature of the Ohio formations:

Present names.		*Proposed names.*
Upper Barren Coal Measures	=	Dunkard formation.
Upper Productive Coal Measures	=	Monongahela formation.
Lower Barren Coal Measures	=	Conemaugh formation.
Lower Productive Coal Measures	=	Allegheny formation.

Columbus, O., December, 1900.

*This section of the Georges Creek valley is published with the permission of Dr. Wm. Bullock Clark, State Geologist of Maryland.

Some information concerning the lower part of the formation was obtained from Prof. James Hall's report regarding the north fork of Jenning's run as abstracted in Macfarlane's Coal-regions of America, 3d ed., 1877, p. 256.

University Bulletin Series 5 Number 9

OHIO STATE UNIVERSITY

CATALOGUE OF THE

COLLEGE OF AGRICULTURE

AND

DOMESTIC SCIENCE

1901-1902

COLUMBUS
PUBLISHED BY THE UNIVERSITY

Entered at the Postoffice, Columbus, Ohio, as second-class matter

OHIO STATE UNIVERSITY

CATALOGUE OF THE

COLLEGE OF AGRICULTURE

AND

DOMESTIC SCIENCE

1901-1902

"One of the wisest things this government ever did was to make ample provision for the great agricultural institutions in this land. We now have more than half a hundred of them to testify to the worth and sagacity of the Congress of these United States."—*President McKinley.*

COLUMBUS
Published by the University
May, 1901

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DAYS AND DATES.

1901.

Entrance Examinations (8 A. M.)	Monday,	September 16.
First Term begins—Registration Day	Tuesday,	September 17.
Lectures and Class-work begin	Wednesday,	September 18.
President's Annual Address	Friday,	September 20.
Meeting of Trustees	Wednesday,	September 25.
Thanksgiving Recess	Thursday,	November 28.
	Friday,	November 29.
Latest Date for Filing Thesis Subjects	Saturday,	December 14.
First Term ends	Wednesday,	December 18.

Christmas Vacation.

1902.

Second Term begins—Registration Day	Thursday,	January 2.
University Day	Saturday,	February 22.
Second Term ends	Friday,	April 4.

Spring Recess.

Third Term begins—Registration Day	Wednesday,	April 9.
Meeting of Trustees	Wednesday,	April 9.
Field Day—Athletic Association	Saturday,	May 17.
Senior Vacation begins	Saturday,	May 24.
Competitive Drill, Cadet Battalion	Saturday,	May 24.
Memorial Day	Friday,	May 30.
Latest Date for Presenting Thesis	Saturday,	June 7.
Final Examinations	Monday to	June 9.
	Friday,	June 13.
Latest Date for Filing bound copy of Thesis	Friday,	June 13.
Baccalaureate Sermon	Sunday,	June 15.
Entrance Examinations (8 A. M.)	Monday,	June 16.
	Tuesday,	June 17.
Class Day	Monday,	June 16.
Meeting of Trustees	Tuesday,	June 17.
Alumni Day	Tuesday,	June 17.
COMMENCEMENT	Wednesday,	June 18.

Summer Vacation.

Entrance Examinations (8 A. M.)	Monday,	September 22.
First Term begins—Registration Day	Tuesday,	September 23.
Lectures and Class-work begin	Wednesday,	September 24.
Annual Address by the President (11 A. M.)	Friday,	September 26.
Meeting of Trustees	Wednesday,	September 24.

BOARD OF TRUSTEES.

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		Term Expires.
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A WINTER SCENE ON THE CAMPUS

THE UNIVERSITY.

T should be noted that the Ohio State University is divided into six colleges as follows :

The College of Agriculture and Domestic Science.
The College of Arts, Philosophy and Science.
The College of Engineering.
The College of Law.
The College of Pharmacy.
The College of Veterinary Medicine.

The College of Agriculture and Domestic Science consists of those departments represented in the courses leading to the degrees of Bachelor of Science in Agriculture, Bachelor of Science in Horticulture and Forestry and Bachelor of Science in Domestic Science ; in the Short Course in Agriculture, in the Short Course in Domestic Science, and in the Course in Dairying.

The College of Arts, Philosophy and Science consists of those departments represented in the courses leading to the degrees of Bachelor of Arts, Bachelor of Philosophy, and Bachelor of Science.

The College of Engineering consists of those departments represented in the courses leading to the degrees of Civil Engineer, Engineer of Mines, Engineer of Mines in Ceramics, Mechanical Engineer, Mechanical Engineer in Electrical Engineering, Bachelor of Science in Industrial Arts, and Bachelor of Science in Chemistry or in Metallurgy ; in the Course of Architecture, in the Short Course in Clay-working and Ceramics, and in the Short Course in Mining.

The College of Law consists of those departments represented in the course leading to the degree of Bachelor of Laws.

The College of Pharmacy consists of those departments represented in the courses leading to the degree of Bachelor of Science in Pharmacy, and in the Short Course in Pharmacy.

The College of Veterinary Medicine consists of those departments represented in the course leading to the degree of Doctor of Veterinary Medicine, and to a certificate of Veterinary Surgeon.

Each College is under the direction of its own Faculty, which has power to act in all matters pertaining to the work of students in that College.

HISTORY.

The land grant made by the United States under an act approved by President Lincoln, July 2nd, 1862, provided that there should be granted to each state an amount of public land equal to thirty thousand acres for each Senator and Representative to which the State was entitled by the apportionment of the census of 1860. The proceeds under this act were to constitute a perpetual fund the capital of which was to remain forever undiminished and the interest of the same was to be inviolably applied by each State which should take and claim the benefit of the act of endowment, support and maintenance of at least one "College where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such a manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Governor Tod, in November, 1862, brought the subject before the State Board of Agriculture and later to the attention of the Legislature. In January, 1864, Hon. Columbus Delano introduced a bill accepting the grant. This became a law February 9th, 1864, and pledged the faith of the State to the performance of all the conditions and provisions contained therein. In 1866, an act introduced by Hon. J. T. Brooks, was passed which provided for the establishment of the Ohio Agricultural and Mechanical College, but the provisions were not carried into effect, and a second act introduced by Hon. R. P. Cannon was passed in 1870 entitled "An act to establish and maintain an Agricultural and Mechanical College in Ohio." Under the provisions of this act the institution was located in Columbus and the Board proceeded to the organization of the College and the election of a Faculty of instruction and the institution was opened for the reception of students on the seventeenth day of September, 1873.

In 1878, the legislature passed "An act to reorganize and change the name of the Ohio Agricultural and Mechanical College and to repeal certain acts therein mentioned." The act provided that the Institution should be thereafter designated as "The Ohio State University." Up to this time but one appropriation had been made by the State for the support of the institution. With the reorganization came the larger and broader view of the State's relation to public education, and since that time the Ohio State University has shared with other public educational institutions a more generous support by the State.

The governing body of the institution is a Board of Trustees, appointed by the Governor of the State and confirmed by the Senate, for terms of seven years as provided in the law organizing the University. The original endowment has been supplemented, and the objects of the University promoted, by a permanent annual grant from the United States, under an act of 1890, by special appropriations of the General Assembly; and in 1891,

by a permanent annual grant from the State which grant was doubled by the Legislature of 1896. In accordance with the spirit of the law under which it is organized, the University aims to furnish ample facilities for education in the liberal and industrial arts, the sciences and the languages, and for thorough technical and professional study of agriculture, engineering in its various departments, veterinary medicine, pharmacy and law. Through the aid which has been received from the United States and from the State it is enabled to offer its privileges, with a slight charge for incidental expenses, to all persons of either sex who are qualified for admission.

LOCATION OF THE UNIVERSITY.

The University is situated within the corporate limits of the City of Columbus, two miles north of the Union Depot and about three miles from the State Capitol. The University grounds consist of three hundred and forty-five acres, bounded east and west by High Street and the Olentangy River, respectively. The western portion, about 235 acres, is devoted to agricultural and horticultural purposes, and is under the management of the College of Agriculture and Domestic Science. The eastern portion is occupied by the principal University buildings, campus, athletic and drill grounds, a park-like meadow, and a few acres of primitive forest.

The grounds are laid out with care, ornamented with trees, shrubs and flower beds; and are so managed as to illustrate the instruction in Botany, Horticulture, Forestry, Landscape Gardening and Floriculture.

The University may be reached by either the North High Street or the Neil Avenue electric cars. Those wishing to go to the principal buildings of the University, to the residences on the grounds, or the Athletic field, should take a High Street car going north. Those wishing to visit the Emerson McMillin Observatory, the Veterinary Hospital, Townshend Hall, Horticultural Hall and the Dormitories, will find the Neil Avenue cars more convenient.

The University has thirteen buildings devoted to instruction, one Boiler House, one Power House, two dormitories, six residences and some farm buildings. These buildings represent an investment for construction of about eight hundred thousand dollars. The equipment and apparatus amount to one hundred and seventy thousand dollars. The land now occupied as a site with the farm is valued at one million five hundred thousand dollars.

The buildings of special interest to the College of Agriculture and Domestic Science are Townshend Hall, Horticultural Hall, Veterinary Hospital, Hayes Hall, Botanical Hall, Biological Hall, Orton Hall (Geological building; contains also the Library), and the Armory and Gymnasium.

The University now has over one hundred instructors and thirty-eight departments of study, offers thirty distinct courses, all but one of which require two or more years for completion. Six of these courses are offered by the College of Agriculture and Domestic Science and are described in this catalogue.

ARMORY AND GYMNASIUM
BIOLOGICAL HALL
TOWNSEND HALL
UNIVERSITY HALL
ORTON HALL

THE COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE.

The College of Agriculture and Domestic Science offers six distinct courses of study:

1. *A four years' Course in Agriculture.*
2. *A four years' Course in Horticulture and Forestry.*
3. *A two years' Course in Agriculture and Horticulture.*
4. *A winter term's Course in Dairying.*
5. *A four years' Course in Domestic Science.*
6. *A two years' Course in Domestic Science.*

THE COURSE IN AGRICULTURE.

About one-half of the students who have graduated from this course have engaged in farming while most of the others have become professors, instructors or experimenters in the agricultural colleges and experiment stations of the country. Still larger numbers, who have pursued the course for two or three years, have become successful farmers or farm superintendents. The course in Agriculture serves as a preparation of either class equally well.

The officers of the College recognize the danger of a too special or technical training of under-graduate students in a subject having such a wide range and one requiring for its successful prosecution such breadth of view. A careful examination of the course as outlined on page 14 will show that about one-third of the time of the student during the four years is or may be devoted to Language, (English and foreign), History and Economics; about one-third to pure science, and one-third to technical or professional training. Electives in the senior year allow for some variation in this regard.

The Course in Agriculture is one of a number of regular four year collegiate courses in the University. This one is designed not only to make specially trained agriculturists, but also educated men. The course presupposes that a young man has had a High School training or its equivalent and that he has had the training in farm matters that necessarily comes to a young man who has lived on a farm. It supplements this training but does not displace it. The technical training in this course consists in those

matters which years of experience in teaching have shown are either lacking or most necessary. Young men from the cities are entering this course, as they should do if they expect to engage in agricultural pursuits, but it should be understood that the Course in Agriculture does not, except incidentally, supply that training in farm matters which comes from actual life upon the farm. Such a course could be readily planned but it would waste the valuable time of nine-tenths of the students who now enter the course. A fuller understanding of the course may be obtained by comparing the outline below with the departmental courses of study beginning on page 25. It will be seen that the general education and training is broad, and liberal and that the technical or professional training is thorough and exact.

No man or woman is thoroughly well educated until he or she has been taught both to do and to think. Both faculties are necessary and each assists the other. Experience and reason, however, teach that the students who enter the Course in Agriculture have been better trained in doing than in thinking. With them manual training is not as necessary as an educational factor as with students from the cities. On the other hand, special emphasis is laid on training the faculties of observation, reason and judgment. It should be understood, however, that the laboratory methods and facilities are most thorough and complete in all scientific and technical courses, giving a training which is impossible to obtain merely from books.

The Course in Agriculture leads to the degree of Bachelor of Science in Agriculture.

OUTLINE OF THE COURSE IN AGRICULTURE.

NOTE—The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR.

REQUIRED.

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Agr'l Chemistry (1) Principles.	5	Agr'l Chemistry (8) Organic.	5	Agr'l Chemistry (9) Applications.	5
Botany (6) Physiological.	5	Botany (7) Physiological and Economic.	5	Botany (8) Economic Botany and Vegetable Pathology.	5
Drawing (10)	2				
Rhetoric (1) and (21) English Composition.	2½	Rhetoric (1) and (21) English Composition.	2½	Rhetoric (1) and (21) English Composition.	2½
Zoology (1) Invertebrate.	3	Shopwork (1)	3		
Cadet Service (men)*		Zoology (1) Invertebrate.	3	Zoology (1) Vertebrate.	3
Hygiene and Physical Training (women)		Cadet Service (men)		Cadet Service (men)	
		Hygiene and Physical Training (women)		Hygiene and Physical Training (women)	

* A rule of the Board of Trustees requires each male student (except student in the College of Law) to render two years' cadet service as a condition of graduation. Students physically incapacitated for cadet service will be assigned an equivalent in special gymnasium work. The President has authority to excuse from cadet service under certain conditions.

Young women are required to carry Hygiene and Physical Training in place of cadet service.

SECOND YEAR.

REQUIRED.

First Term.	Credit hours
Agriculture (8) Breeds of Live Stock.	4
Agr'l Chemistry (4) Laboratory.	5
Horticulture (1) Elements.	4
Physiology (1) Anatomy.	3
Zoology (4) Economic Entomology.	2
Cadet Service (men)	
Hygiene and Physical Training (women)	

Second Term.	Credit hours
Agriculture (9) Principles of Breeding	4
Agr'l Chemistry (4) Laboratory.	5
Shopwork (2)	3
Physiology (1) Physiology.	3
Zoology (4) Economic Entomology	2
Cadet Service (men)	
Hygiene and Physical Training (women)	

Third Term.	Credit hours
Agriculture (10) Stock Feeding	4
Agr'l Chemistry (4) Laboratory.	5
Horticulture (3) Plant Propagation.	4
Physiology (1) Physiology.	3
Zoology (4) Economic Entomology	2
Cadet Service (men)	
Hygiene and Physical Training (women)	

THIRD YEAR.

REQUIRED.

Agriculture (11) Farm Equipment.	4	Agriculture (12) Soils.	4	Agriculture (13) Crops.	4
				Drawing (16)	3
†French (1) Elementary, or †German (1) Elementary.	4	French (1) Elementary, or German (1) Elementary.	4	French (1) Elementary, or German (1) Elementary.	4
Geology (2) General.	5	Geology (3) Economics.	3	Astronomy (8) Meteorology.	2
Veterin'y Medicine (28) Anatomy.	5	Veterin'y Medicine (29) General Patho'ogy.	5	Veterin'y Medicine (30) Special Pathology.	5

FOURTH YEAR.

REQUIRED.

Agriculture (14) Animal Mechanics.	4	Agriculture (15) Dairy.	4	Agriculture (16) Rural Economics.	4
History (1) U. S. Political.	4	History (1) U. S. Political.	2	Economics (1) Political Economy.	4
		Economics (1) Political Economy.	2		
Thesis	2	Thesis	2	Thesis	2

ELECTIVE

Eight hours a week through the year, including two for thesis chosen from any of the courses given in any College of the University upon which the student is qualified to enter ; except in the College of Law.

FOURTH YEAR.

(Beginning September, 1902.)

REQUIRED.

History (1) U. S. Political.	4	History (1) U. S. Political.	2	Economics (1) Political Economy.	4
		Economics (1) Political Economy.	2		
Thesis	2	Thesis	2	Thesis	2

† Where credit is received for Elementary French or German, French (2) 4 hours or German (4) 4 hours is required.

BOTANICAL HALL

HAYES HALL

HORTICULTURAL HALL

Eight hours per week through the year; chosen from any of the following courses:

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Agriculture (14) Animal Mechanics.	4	Agriculture (18) Zootechny	4	Agriculture (16) Rural Economics.	4
Agriculture (19) Rural Engineering.	4	Agriculture (20) Agronomy.	4	Agriculture (21) Agronomy.	4
Agriculture (22) Dairying.	4	Agriculture (15) Dairying.	4	Agriculture (25) Dairying.	4
*Agricultural Chemistry (6) Laboratory.	4	Ag'l Chemistry (6) Laboratory.	4	Ag'l Chemistry (6) Laboratory.	4
Veterinary Medicine (24)	3	Veterinary Medicine (18)	3	Veterinary Medicine (18)	3

ELECTIVE.

Four hours a week through the year chosen from any of the courses given in any of the Colleges of the University upon which the student is qualified to enter, except the College of Law.

THE COURSE IN HORTICULTURE AND FORESTRY.

Horticulture and Forestry are rapidly developing arts. Their successful practice, like that of other arts, is largely dependent upon science.

Chemistry, Physics, Botany, Geology, Entomology and other sciences, are the natural basis of a sound, practical knowledge of those things with which the fruit culturist, gardener, nurseryman and forester have to deal.

While science may teach much regarding the origin and growth of plants, it does not teach how to select varieties, how to propagate, transplant, cultivate, fertilize, prune, or what is even more essential, how to harvest and market the product to the best advantage.

All the science in the world, while it will signally help, cannot of itself make a good fruit-culturist, florist or landscape gardener.

Science and Art, theory and practice should go hand in hand.

This course was established to meet a growing demand for special training. It seeks to ground the student in those sciences that are fundamental, and to give a thorough drill in all methods of plant propagation and the more technical branches of horticulture and forestry.

The forcing of winter vegetables and the cultivation of the finer products of the garden and orchard are rapidly extending.

Commercial floriculture is developing with marked rapidity, and forestry is engaging the attention of the thoughtful as never before. For earnest, enterprising young men and women, horticulture and forestry in their various branches, offer as large a reward for intelligent, well directed effort as any other pursuit or profession.

The Course in Horticulture and Forestry leads to the degree of Bachelor of Science in Horticulture and Forestry.

*In case a student intends to elect Agricultural Chemistry (6) 4 and Agriculture (19), (20), and (21) 4, he may elect Agricultural Chemistry 5 hours in place of Veterinary Medicine (28), (29), and (30) 5.

OUTLINE OF THE COURSE IN HORTICULTURE AND FORESTRY.

FIRST YEAR.

REQUIRED.

First Term.	Credit hours
Agr'l Chemistry (1) Principles.	5
Botany (6) Physiological.	5
Drawing (10)	2
Rhetoric (1) and (21) English Composition.	2½
Zoology (1) Invertebrate.	3
Cadet Service (men)	
Hygiene and Physical Training (women)	

Second Term.	Credit hours
Agr'l Chemistry (8) Organic.	5
Botany (7) Physiological, Economic.	5
Rhetoric (1) and (21) English Composition.	2½
Shopwork (1)	3
Zoology (1) Invertebrate.	3
Cadet Service (men)	
Hygiene and Physical Training (women)	

Third Term.	Credit hours
Agr'l Chemistry (9) Applications.	5
Botany (8) Economic Botany. Vegetable Pathology.	5
Rhetoric (1) and (21) English Composition.	2½
Zoology (1) Vertebrate.	3
Cadet Service (men)	
Hygiene and Physical Training (women)	

SECOND YEAR

REQUIRED.

Agr'l Chemistry (4) Laboratory.	5
*French (1) Elementary, or *German (1) Elementary.	4
Horticulture (1) Elements.	4
Physiology (1) Anatomy.	3
Zoo'ogy (4) Economic Entomology.	2
Cadet Service (men)	
Hygiene and Physical Training (women)	

Agr'l Chemistry (4) Laboratory.	5
French (1) Elementary, or German (1) Elementary.	4
Shopwork (2)	3
Physiology (1) Physiology.	3
Zoo'ogy (4) Economic Entomology.	2
Cadet Service (men)	
Hygiene and Physical Training (women)	

Agr'l Chemistry (4) Laboratory.	5
French (1) Elementary, or German (1) Elementary.	4
Horticulture (3) Plant Propagation.	4
Physiology (1) Physiology.	3
Zoology (4) Economic Entomology.	2
Cadet Service (men)	
Hygiene and Physical Training (women)	

THIRD YEAR.

REQUIRED.

Agriculture (11) Farm Equipment.	4
French (2) or German (4)	4
Geology (2) General.	5
Horticulture (5) Varieties of Fruit.	4

Agriculture (12) Soils.	4
French (2) or German (4)	4
Geology (5) General.	3
Horticulture (6) Principles of Fruit Culture.	4

Agriculture (13) Crops.	4
Astronomy (3) Meteorology.	2
Drawing (16)	3
French (3) or German (4)	4
Zoology (4) Economic Entomology	3
Horticulture (7) Small Fruits and Spraying.	4

*Where credit is received for Elementary French or German, French (2) 4 or German (4) 4 is required.

FOURTH YEAR.

REQUIRED.

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Horticulture (8) Elements of Floriculture.	2	Horticulture (9) Commercial Floriculture.	2	Horticulture (10) Home Floriculture.	2
Horticulture (11) Arboriculture.	2	Horticulture (12) Forestry and Sylviculture.	2	Horticulture (13) Landscape Gardening.	2
History (1) U. S. Political.	4	History (1) U. S. Political.	2	Economics (1) U. S. Political.	4
		Economics (1) Political Economy.	2		
Thesis	2	Thesis	2	Thesis	2

ELECTIVE

Eight hours a week through the year chosen from any of the courses given in any College of the University upon which the student is qualified to enter; except in the College of Law.

THE SHORT COURSE IN AGRICULTURE.

The Short Course in Agriculture is a two years course, the first year of which is made up largely of studies preparatory either to the second year of the short course or the first year of the four years' course in Agriculture or in Horticulture and Forestry. While believing that the four years' course is none too long for the students who expect to engage in agricultural pursuits, yet it is recognized that there are many students whose circumstances make it impossible to take a four years' collegiate course in Agriculture, and yet who are anxious and would be greatly benefited by taking a less extended training for their life work.

This course is especially desirable for students of rather mature age. The Short Course in Agriculture also enables students who lack the training to enter the four years' course in Agriculture or in Horticulture and Forestry to make up in large part such deficiency. A considerable number of students in these advanced courses have formerly been students of the short course. This course contains as thorough instruction in Agriculture, Animal Industry, Dairying, Horticulture, (including Fruit Culture, Vegetable Gardening and Floriculture) and Forestry, Veterinary Medicine, Economic Entomology and the Sciences underlying these subjects as the time will admit. The second year contains optional work so that it is possible for students to specialize in Horticulture, Agriculture or Animal Industry and Dairying.

No degree is given on the completion of the Short Course in Agriculture but a certificate is issued stating fully the work done.

OUTLINE OF THE SHORT COURSE IN AGRICULTURE.

FIRST YEAR.

REQUIRED

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Agr'l Chemistry (1) Principles.	5	Agr'l Chemistry (8) Organic.	5	Agr'l Chemistry (9) Applications.	5
Mathematics (1) Algebra.	5	Mathematics (3) Geometry.	5	Botany (1) Elementary,	5
Physics (1) Elementary.	5	Physics (1) Elementary.	5	Geology (1) Physiography.	5
Drawing (10) Mechanical.	2	Shopwork (1)	3	Physiology (2) General.	3
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR.

Not less than 15 hours per week through the year; chosen from any of the following courses subject to conditions named under "Departments of Instruction."

Agriculture (8) Breeds of Live Stock.	4	Agriculture (9) Principles of Breeding	4	Agriculture (10) Stock Feeding.	4
Agriculture (11) Farm Equipment.	4	Agriculture (12) Soils.	4	Agriculture (13) Crops.	4
Agriculture (17) Milk Sanitation.	3	Agriculture (15) Dairy.	4	Zoology (7) Entomology.	3
Botany (6) Physiological.	5	Horticulture (2) Greenhouse Construction.	4	Horticulture (3) Plant Propagation.	4
Horticulture (1) Elements.	4	Shopwork (2)	3	Veterinary Medicine (30) Special Pathology.	5
Veterinary Medicine (28) Anatomy.	5	Veterinary Medicine (29) General Pathology.	5	Horticulture (7) Small Fruits and Spraying.	4
Horticulture (5) Varieties of Fruit.	4	Horticulture (6) Principles of Fruit Culture.	4		
Cadet Service.		Physiology (6) Cadet Service.	2	Cadet Service.	

THE COURSE IN DAIRYING.

The Course in Dairying is established to meet the wants of those who have neither the time nor means for the above extended courses. It is designed especially for those who are desirous of mastering the art of butter and cheese making or who wish to become fitted for the position of manager or superintendent of a creamery or cheese factory. In this course the greater part of the time is given to the laboratory or dairy room practice. This consists in the testing of milk as to purity and contents of butter fat; the use and care of centrifugal separators and other dairy devices; the making of butter and cheese by the most improved methods; in short, all the essential operations of the creamery, factory and home dairy management are repeatedly performed under the guidance and direction of competent instructors. The laboratory or dairy room practice is supplemented,

however, by lectures and recitations upon the subjects of breeding, feeding, selecting and judging of dairy stock; the diseases of the cow; the chemistry of milk; the effect of bacteria and other agents upon milk and its products; the care of boilers and engines and similar subjects.

The Course in Dairying begins the first Thursday in January; all other courses begin on Tuesday following the sixteenth of September. Students wishing to take the Course in Dairying should send for special pamphlet entitled "The Dairy School."

OUTLINE OF THE COURSE IN DAIRYING.

Agriculture (5). Dairy Farming.—Three hours each week. Lectures and recitations on breeds, breeding, feeding, selection and judging of dairy stock, equipment and management of dairy farms.

Agriculture (6). Butter and Cheese-making.—Four half days each week. Laboratory practice in running separator, churning, working butter, making cheese, milk testing, etc.

Agriculture (7). Butter and Cheese-making.—Two hours each week. Lectures and recitations and laboratory work.

Agricultural Chemistry (7). Milk Chemistry and Milk Testing.—Four hours each week. Lectures and laboratory practice.

Physiology (6). Bacteria in their relation to Milk, Butter and Cheese.—Two hours each week. Lectures and Laboratory practice.

Veterinary Medicine (17). Diseases of the Cow. Three hours each week.

Mechanical Engineering (26). Steam Machinery. One hour each week.

THE COURSES IN DOMESTIC SCIENCE.

Four years ago, the Ohio State University recognized the demand for a broader education for young women, by introducing a course in Domestic Science.

The course was planned for no one class of women; not particularly for city or country girls, but in the hope that it might appeal to the most womanly side of all women. The desire was, and is, that by the practical and scientific study of home problems, women shall come to see more in household duties than a mere routine; to recognize that Economics has its foundation in domestic relations; that Art and Ethics have no higher use than to purify and beautify every day subjects; and that the history and literature of the past have direct bearing upon the present. In other words, the authorities believed that by practically applying the pure sciences and arts to domestic life, our women should be better able to build ideal homes and an ideal nation.

The studies pursued in the Department of Domestic Economy, while closely affiliated, naturally group themselves first about the sciences and later about the arts, and for convenience, such work as that with Foods, Sanitation and Hygiene, which directly makes demands along scientific lines, is classed as Domestic Science, and the work made possible by the wise acceptance of scientific laws, and by a general knowledge of the culture of past ages; that is, the work of developing beautiful and harmonious surroundings, is classed as Domestic Art.

The College offers two courses in this work: A two years' course planned for those, who can give but a limited time to University training, and a four years' course, requiring a more advanced standing for entrance and leading to the degree of Bachelor of Science in Domestic Science.

As outlined farther on the lectures and laboratory work dealing particularly with Domestic Economy, require about one-fourth of the schedule time during the last three years of the long course; the first year and the remaining thirteen or fourteen hours required during each term of the second, third and fourth years, are devoted to allied University studies.

The equipment of the department has been carefully selected and is adequate for thorough and conscientious work. Every effort is being made to develop the course along broad and safe lines, and the large number of students who have chosen so new a course, and the unflagging interest evinced by them, betokens the success of the undertaking.

OUTLINE OF THE COURSE IN DOMESTIC SCIENCE.

FIRST YEAR.

REQUIRED.

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Agr'l Chemistry (1) Principles.	5	Agr'l Chemistry (8) Organic.	5	Agr'l Chemistry (9) Applications.	5
Botany (6) Physiological.	5	Botany (7) Physiological and Economic.	5	Botany (8) Economic Botany. Vegetable Pathology.	5
Drawing (1)	2	Drawing (1)	2	Drawing (1)	2
Rhetoric (1) and (21) English Composition.	2½	Rhetoric (1) and (21) English Composition.	2½	Rhetoric (1) and (21) English Composition.	2½
Zoology (1) Invertebrate.	3	Zoology (1) Invertebrate.	3	Zoology (1) Invertebrate.	3
Hygiene and Phys. Train.		Hygiene and Phys. Train.		Hygiene and Phys. Train.	

SECOND YEAR.

REQUIRED.

Agr'l Chemistry (4) Laboratory.*	5	Agr'l Chemistry (4) Laboratory.	5	Physiology (3) Chemical Physiology.	3
				Physiology (10)	2
Domestic Economy (1)	4	Domestic Economy (2)	4	Domestic Economy (3)	4
Drawing (10) Mechanical.	2	Drawing (15) Architectural.	2	Drawing (15) House Designing.	2
†French (1) Elementary, or †German (1) Elementary.	4	French (1) Elementary, or German (1) Elementary.	4	French (1) Elementary, or German (1) Elementary.	4
Physiology (1)	3	Physiology (1)	3	Physiology (1)	3
Hygiene and Phys. Train.		Hygiene and Phys. Train.		Hygiene and Phys. Train.	

*Specific laboratory work will be provided for students in this course, where necessary.

†Where credit is received for elementary French or German, French (2) 4 hours or German (4) 4 hours is required.

THIRD YEAR.

REQUIRED.

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Domestic Economy (4)	4	Domestic Economy (5)	4	Domestic Economy (6)	4
French (2) or German (4)	4	French (2) or German (4)	4	French (2) or German (4)	4
History (1) U. S. Political.	4	History (1) U. S. Political.	2	Economics (1) Political Economy.	4
Education (1)	3	Economics (1) Political Economy.	2	Education (1)	3
English Literature (1)	2	Education (1)	3	English Literature (1)	2
		English Literature (1)	2		

FOURTH YEAR.

REQUIRED.

Domestic Economy (7)	4	Domestic Economy (8) 4	Domestic Economy (9) 4
Horticulture (9) Elements of Floriculture.	2	Horticulture (10) 2 Window Gardening.	Horticulture (11) 2 Home Floriculture.
Thesis	2	Thesis 2	Thesis 2

ELECTIVE.

Eight hours a week through the year chosen from any of the courses given in any College of the University upon which the student is qualified to enter; except in the College of Law.

OUTLINE OF THE SHORT COURSE IN DOMESTIC SCIENCE.

FIRST YEAR.

REQUIRED.

Agr'l Chemistry (1) Principles.	5	Agr'l Chemistry (8) Organic.	5	Agr'l Chemistry (9) Applications.	5
Physics (1) Elementary.	5	Physics (1) Elementary.	5	Botany (1) Elementary.	5
French (1) or German (1)	4	French (1) or German (1)	4	French (1) or German (1)	4
Rhetoric (1) and (21) English Composition.	2½	Rhetoric (1) and (21) English Composition.	2½	Rhetoric (1) and (21) English Composition.	2½
Hygiene and Phys. Train.		Hygiene and Phys. Train.		Hygiene and Phys. Train.	

SECOND YEAR.

REQUIRED

Domestic Economy (1)	4	Domestic Economy (2)	4	Domestic Economy (3)	4
Domestic Economy (4)	4	Domestic Economy (5)	4	Domestic Economy (6)	4
Hygiene and Phys. Train.		Hygiene and Phys. Train.		Hygiene and Phys. Train.	

ELECTIVE

Not less than seven hours per week chosen from the following courses; subject to the conditions named under "Departments of Instruction":

Botany (6) Physiological.	5	Botany (7) Physiological and Economic.	5	Botany (8) Economic Botany, Vegetable Pathology.	5
Drawing (1)	2	Drawing (1)	2	Drawing (1)	2
Education (1)	3	Education (1)	3	Education (1)	3
English Literature (1)	2	English Literature (1)	2	English Literature (1)	2
Horticulture (9) Elements of Floriculture.	2	Horticulture (10) Window Gardening.	2	Horticulture (11) Home Floriculture.	2
Zoology (1) Invertebrate.	3	Zoology (1) Invertebrate.	3	Zoology (1) Vertebrate.	3

STUDENT WORK IN ANIMAL MECHANICS

LIVE STOCK JUDGING ROOM, TOWNSHEND HALL

THE DEPARTMENTS OFFERING INSTRUCTIONS IN THE COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE.

To determine relation and sequence of studies consult outlines of College courses beginning on page 14.

AGRICULTURE.

Townshend Hall.

ZOOTECHNY AND RURAL ECONOMICS

PROFESSOR HUNT, MR. RUHLEN.

8. **Breeds of Live Stock.** Lectures and recitations three times a week upon the history, characteristics, adaptation, care and management of the different breeds of domestic animals. Practicum once a week in scoring and judging live stock. First term.

9. **Principles of Breeding.** Lectures and recitations three times a week upon the laws of heredity and their practical applications. Practicum once a week in scoring and judging live stock, and in writing and tracing pedigrees. Second term.

10. **Stock Feeding and Hygiene.** Lectures and recitations three times a week upon the laws of nutrition, the character of food stuffs, the relation of the food to the animals, and the kind and quantity of food to produce given effects. Practicum once a week in calculating digestibilities, nutritive ratios and feeding standards. Third term.

14. **Animal Mechanics and Exterior.** Lectures and recitations three times a week upon animal mechanics, proportions, and the relation of the latter to specific uses. Practicum once a week in measuring animals and testing the value of given measurements for given purposes. First term.

18. **Stock Judging and Management.** Lectures and recitations twice a week. Practicums twice a week. Second term.

16. **History of Agriculture and Rural Economics.** Lectures and recitations upon the history of agriculture; present agricultural methods in various countries; cost and relative profits of various farm operations and systems. Four times a week. Third term.

5. **Dairy Farming.** Lectures twice a week upon breeds, and upon feeding, breeding and selecting dairy stock; equipment and management of dairy farms. Practicum once a week in scoring and judging live stock, writing pedigrees, and calculating feeding standards. Second Term.

SOIL PHYSICS LABORATORY, TOWNSHEND HALL

LABORATORY WORK IN FARM EQUIPMENT

AGRONOMY AND FARM EQUIPMENT.

PROFESSOR GIBBS.

11. **Farm Equipment.** Lectures and recitations three times a week upon selecting, planning and equipping farms; planning and erecting farm buildings and fences; building roads; farm vehicles and machinery; power, water and drainage. Practicum once a week in drawing plans of farms and farm buildings; leveling and laying drains; dynamometer tests of wagons and farm implements. First term.

12. **Soils.** Lectures and recitations three times a week upon the origin, formation, kinds, and physical properties of soils and their improvement by cultivation, fertilization, drainage, and irrigation. Practicum once a week in laboratory, testing physical properties of several soils; determining the relation of soils to heat, moisture, air and fertilizers, and making mechanical analyses. Second term.

13. **Farm Crops.** Lectures and recitations three times a week upon the history, production, marketing, cultivation and harvesting of farm crops. Practicum once a week with growing and dried specimens of crops, including grasses, clovers and other forage crops. Third term.

19. **Agronomy.** Lectures and recitations twice a week on the physical properties of soils; the relation of soils to heat, air and moisture; the effect of fertilizers on soil structure and fertility; consideration of practical methods of tillage as effecting crop producing power of the soil. Laboratory and field experiments four hours each week. First term.

This course must be preceded by course (12).

20. **Agronomy.** Lectures and recitations three times a week on: (a) The effect of climate, soil, and markets on the distribution and adaptation of farm crops in the United States. (b). The best method of crop production including a careful study of the details of field experimentation as set forth in experiment station bulletins and reports and the publications of the United States Department of Agriculture. (c) The consumption of farm crops. Practicum two hours each week. Second term.

This course must be preceded by course (13).

21. **Rural Engineering.** Lectures and recitations twice a week on: (a) Laying out the farm, including location of buildings and works; division of the farm into fields and yards, and the survey and measurement of the same. (b) Construction of buildings and works, including water supply, drains, sewage system, and roads. (c) The construction and use of farm machinery, including the application of mechanical principles in its structure and operation. Special attention will be given to comparisons and tests of various makes and kinds of farm machinery. Practicum four hours each week. Third term.

This course must be preceded by course (11).

DAIRY STUDENTS PRESSING THE CHEESE

ASSEMBLING SEPARATORS, TOWNSHEND HALL

DAIRYING.

ASSOCIATE PROFESSOR DECKER, MR. HERRICK, MR. CROWNER.

6. **Butter Making and Cheese Making.** Practice four half days each week in testing milk as to purity, contents of butter fat; in the use and care of centrifugal separators of different makes and other creamery and dairy devices; and in the making of butter and cheese by the most improved methods. In a word, all the essential operations of the creamery, factory, and home dairy, are repeatedly performed under the guidance and direction of the instructors until efficiency is attained. Neither is the student allowed to do this work by the rule of thumb. He is required to follow the milk from the time it enters the laboratory until the finished product leaves it, and to determine the points in the process where losses occur and the reason therefor. Second term.

7. **Butter Making and Cheese Making.** Lectures and recitations on methods of creaming; factors which control the thoroughness of separation, either by gravity or centrifugal force; explanations of the continuous separation of cream; of ripening cream and testing for acidity; on the philosophy and methods of churning; the effect of temperature, acidity and richness of cream on time and completeness of churning; on the salting, working, packing and marketing of butter; on the fermentation of milk as affecting cheese making; on the curd test for detecting gassy or bad flavored milk; on the rennet test; on the cutting, heating, milling, salting and pressing of the curd; on the curing and shipping of cheese; on the judging of butter and cheese and the pasteurization of milk. There are also lectures upon the construction, equipment and operation of creameries, cheese factories, dairies and milk depots. Each student is required to draw a plan of a dairy, a creamery or a cheese factory and prepare the estimate for the equipment of the same. Two hours each week. Second term.

15. **Butter and Cheese Making.** Lectures twice a week. Laboratory practice twice each week. This course is the same as courses 6 and 7, except that less laboratory practice is taken. Second term.

17. **Milk Sanitation.** Three times a week. First term. Lectures on and laboratory practice in what constitutes pure dairy products, such as milk, butter and cheese, together with the common methods of adulteration, such as skimming, watering, preserving with chemicals injurious to health, and the effect of sanitary conditions on the keeping qualities and healthfulness of the same; pasteurization and other methods of preparing milk for sale.

22. **Butter and Cheese Making.** Lectures and laboratory work four times a week. First term.

25. **Butter and Cheese Making.** Lectures and laboratory work four times a week. Third term.

BOTTLING AND PASTEURIZING ROOM, TOWNSHEND HALL

AGRICULTURAL CHEMICAL LABORATORY, TOWNSHEND HALL

AGRICULTURAL CHEMITSRY

(Townshend Hall, Rooms 29, 35, 34 and 30.)

PROFESSOR WEBER, MR. VINSON.

1. **Principles of Chemistry and Chemical Nomenclature.** Lectures and text-book for three or four weeks, five times a week; then lectures twice a week on Chemistry of Non-metals, and laboratory practice three times a week. First term.

8. **Organic Chemistry.** Lectures twice a week; laboratory practice three times a week. Second term. In connection with the lectures, Norton's Chemistry or any other good text book on elementary chemistry is used. The laboratory work consists of a complete, systematic course in qualitative analysis. As a guide Weber's Select Course in Qualitative Analysis is employed. This course is finished at the end of the second term.

9. **Application of Chemistry to Agriculture.** Lectures twice a week; laboratory three times a week. Third term. In the third term, the lectures embrace the following topics: Ingredients of plants, organic and inorganic, essential and non-essential; sources of plant food, air and soil; nature of soil, mechanical portion, nutritive portion, assimilable and reserve plant food. At this point, the class is divided into two sections, the students of Agriculture continuing with soil exhaustion and amelioration; barnyard manure, its sources, composition and preservation; commercial fertilizers, their rational use and methods of determining the needs of soils; feeding stuffs and feeding rations. The students of Domestic Science are given for the remainder of the term a course of lectures on food adulteration illustrated with specimens obtained from the markets. The laboratory work of the third term begins with the quantitative analysis of simple salts as sodium sulphate and potassium chloride and continues with the analysis of limestones, soils, manures, feeding stuffs, and the short method of sanitary water analysis. The students of Domestic Science omit the analysis of soils and manures.

4. **Lectures and Laboratory.** Five times a week through the year. In the second term two hours a week are devoted to lectures on the industries related to agriculture, as the manufacture of sugar from cane, sorghum and beets; the manufacture of starch, glucose and dextrine; the nature and manufacture of vinegar, as fruit, malt and distilled vinegar; the manufacture of alcohol, malt liquors and wines. In the laboratory, the work consists of the official methods of analyzing fertilizers, feeding stuffs, milk, butter and cheese; the analysis of sugar, syrup and sugar producing plants, as beets; determination of cane sugar, milk sugar, reducing sugar and dextrine; also the determination of cane sugar and milk sugar by means of the polariscope. The analysis of flour, fruits, vegetables, condiments, etc. The analysis of vinegar, as cider, malt and distilled vinegar; the analysis of spiritous and

BACTERIOLOGICAL LABORATORY, BIOLOGICAL HALL

PHYSIOLOGICAL LECTURE ROOM, BIOLOGICAL HALL

fermented liquors. Students of other departments may also elect *three hours* through the year in this course.

6. **Laboratory.** Elective *five* or *three times* a week through the year. The work of this course consists of the complete sanitary analysis of water, for which a special room detached from the main laboratory has been fitted up; the complete analysis of soils; the various official methods of determining nitrogen, potash and phosphoric acid; the analysis of oils and fats; complete analysis of grain; the analysis of tea and coffee; the examination of foods, syrups, spices, condiments, flavoring extracts for adulteration; also any work of previous courses, which for lack of time, may not have been completed.

7. **Chemistry of Milk and Milk Testing.** Lectures twice a week and laboratory practice twice a week. Second term. For dairy students. The lectures include a short course in elements of chemistry; the chemistry of the fourteen elements occurring in milk; the composition of milk, butter and cheese; the adulteration of milk, butter and cheese and the methods of detection. The laboratory work covers the following manipulations: The Babcock method of determining fat in pure milk, skimmed milk, cream, sour milk and cheese; the testing of instruments (milk bottles, lactometers, &c.). The calculation of the composition of milk by Fleischman and Babcock formulæ; the determination of preservatives in milk; the detection of artificial colors in butter and oleomargarine, &c.

ANATOMY AND PHYSIOLOGY

(Biological Hall, Rooms 12 and 20)

Professor Beile, Assistant Professor Morrey, Mr. Dresbach.

1. **Human Anatomy and Physiology.** Lectures, recitation and laboratory work three times a week. First, second and third terms. This course must be preceded by, or accompanied with, a course in chemistry.

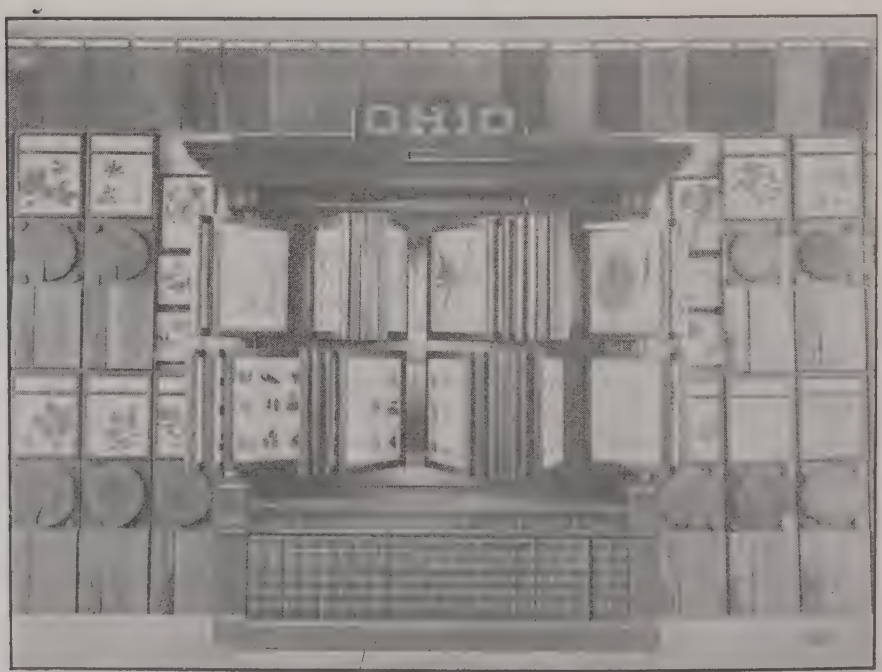
2. **General Physiology.** Lectures, recitations and demonstrations. Three times a week. Third term.

3. **Chemical Physiology.** Three times a week. Third term.

6. **Bacteriology.** Lectures and laboratory work on the general facts concerning bacteria and their relation to life processes followed by lectures on their special application to dairy and other agricultural industries. Twice a week. Second term.

10. **Bacteriology.** Lectures and laboratory work on the general facts concerning bacteria and their relation to life processes followed by lectures of their special application to cooking and other domestic affairs. Twice a week. Third term.

CENTRAL BED IN SEC. 1, BOTANICAL GREENHOUSE



A VIEW IN THE BOTANICAL MUSEUM

ASTRONOMY

(Emerson McMillin Observatory).

PROFESSOR H. C. LORD, Director of the Observatory.
MR. J. WARREN SMITH, Special Lecturer on Meteorology.

3. **Meteorology.** Lectures on practical meteorology, supplemented by laboratory work in map and chart making, and regular observations with the instruments in use by the Weather Bureau. Text-book, Waldo, with daily weather maps issued by the Bureau. Twice a week. Third term.

BOTANY.

(Botanical Hall).

PROFESSOR KELLERMAN, ASSISTANT PROFESSOR SCHAFFNER,
FLORIST LUKE, MR. TYLER, MISS BURR, MR. FISCHER.

1. **Elementary Botany.** Lectures and recitations three times a week, laboratory work twice a week. Credit five hours. Spring term. Text-book Kellerman's Elementary Botany and Spring Flora. This is a general course introductory to those that follow. It comprises mostly Organography and Vegetable Physiology and a study of the native flora, but some instruction is also given in Ecology and Classification. For the practical or laboratory work, Kellerman's Practical Exercises is used as a guide. The students are required to do some work in the field in both observation and collecting.

6. **Physiological Botany.** Lectures and recitations three times a week and laboratory and field work twice a week. Credit five hours. Fall term. Text-book, Coulter's Plant Structures. This is intended to be a complete course showing the evolution of plants from the lowest to the highest. Ecology and Physiology are the more prominent subjects but some instruction is given on Morphology and Classification. The laboratory work includes a general course in histology with practice in experimental physiology. The student receives instruction and practice in handling the microscope and has the opportunity of learning much of the important modern methods in technique.

7. **Physiological and Economical Botany.** Lectures and recitations three times a week and laboratory twice a week. Credit five hours. Winter term. Text-book, Coulter's Plant Structures. This course is, in part, a continuation of Course 9, but the latter half of the term is devoted to a botanical study of economic plants and the vegetable products of commerce. The laboratory work includes the microscopic study of fibres, starches, resins, gums and many other important vegetable products.

8 **Vegetable Pathology.** Lectures and recitations three times a week. Laboratory and field work twice a week. Credit five hours. Spring

DINING ROOM, DEPARTMENT OF DOMESTIC ECONOMY, HAYES HALL

DOMESTIC SCIENCE LABORATORY, HAYES HALL

term. Text-book, Massee's Plant Diseases. The diseases of plants due to inorganic causes are studied, but the main part of the course is devoted to a study of the parasitic fungi most destructive to cultivated plants. The means of their prevention forms the last part of the course. The laboratory and field work deals mainly with the commonest and most injurious parasitic fungi. Each student takes up the latter part of the term some economic subject or group of parasites for special study.

ELECTIVE COURSES.

8. **Dendrology.** Lectures and field work. Credit two hours. First term. Kellerman's Forest Trees of Ohio and various reference books are used. The native trees are studied and illustrative collections made.

10. **Dendrology.** Laboratory work and special investigations on the structure and diseases of timber. Credit two hours. Second term.

11. **Laboratory Work.** Special investigation in Economic Botany and Vegetable Pathology. First, second and third terms. Credit two to five hours.

DOMESTIC ECONOMY.

(Hayes Hall. Rooms 1, 3 and 10).

ASSOCIATE PROFESSOR BOWMAN. ASSOCIATE PROFESSOR SOUTHER.

DOMESTIC SCIENCE.

1. **Food Economics.** One lecture and three laboratory periods each week. Four hours credit. Lectures embracing, a study of the evolution of society as affected by food conditions; second a study of food principles. Laboratory work includes experimental work with foods, and the preparation and serving of typical foods of certain classes. First term.

2. **Food Economics.** One lecture and three laboratory periods each week. Four hours credit. By lecture and research work, the relative nutritive and money values of foods are considered. Each student prepares a weekly dietary for the family; the amount to be expended limited by the instructor. United States Agricultural Bulletin standards used. Laboratory work is a continuation of Course 1. Second term.

3. **Emergency Work and Home Nursing.** One lecture and three laboratory periods each week. Four hours credit. The lectures, demonstrations and practical work are designed to set forth the principles underlying good nursing, to take up the dietetic treatment of various diseases and to consider such emergency cases as frequently require prompt treatment in the home. Food suitable for invalids, infants and convalescents is prepared in the laboratory. Third term.

A CORNER IN DOMESTIC SCIENCE LABORATORY, HAYES HALL

DOMESTIC ART LABORATORY, HAYES HALL

4. (*a*). **Preservation of Foods.** Four weeks.

(*b*). **Hygiene of Clothing.** Eight weeks.

One lecture and three laboratory periods each week. Four hours credit.

(*a*). Includes a brief study of the causes of decomposition, a history of the methods employed in the preservation of foods, and practical work n canning, preserving, etc.

(*b*). Includes a study of fibres and their proper treatment. The properties and cleansing effect of water and soap; disinfecting clothing; the chemical treatment of stains and demonstrated work in practical laundry methods. First term.

10. **Household Economics.** Lecture course. Elective. Two hours. A consideration of the best location for a house; its hygienic and sanitary construction and arrangement and approved methods of lighting, heating and ventilating. Third term.

DOMESTIC ART.

5. Lectures on the **Industrial and Artistic Evolution of Society.** History of the early races considered with special reference to the development in culture gained through hand-work. Practice work: Preparations of a series of models comprising the different stitches used in plain hand sewing; ornamental stitches and simple embroidery. One lecture and three practice periods each week. Four hours credit. Second term.

6. **Lectures on Textiles.** Study of fibres; their growth and the processes of their manufacture. Comparative economic value of fabrics. Practice work: Machine and hand work on underwear; drafting from simple measurements; designing in pencil; use of patterns; making shirt waists or wash gowns; Simple straw hats and bows. One lecture and three practice periods a week. Four hours credit. Third term.

7. **Lectures on Historic Costume.** Consideration of line, form and color; hygienic and artistic dress; treatment of wool and silk fabrics. Practice work; Drafting patterns by use of Tailoring System. Cutting and fitting. Making wool dress. Making of hat frames, covering and trimming the same. One lecture and three practice periods a week. Four hours credit. First term.

8. **Lecture and Practice Work.** Continuation of Course 7. As much time as possible being given to pencil and water color designing of costumes and hats suitable to different wearers. Original designs required to be made and carried out in the case of each individual pupil. One lecture and three practice periods a week. Four hours credit. Second term.

9. **Lectures on History of Domestic Art and Architecture and the Application of Art to Modern House Decoration.** Practice work: Continuation of Course 8. Further work in practical costume making as may be designated by the instructor; the aim being to foster good taste and judgment

ART ROOM, HAYES HALL

MECHANICAL DRAWING ROOM, HAYES HALL

in the use of expensive and inexpensive materials. Expressions of individuality encouraged but held subservient to general artistic principles, to rules of hygiene and to prevailing modes. One lecture and three hours practice work each week. Four hours credit. Third term.

Note. Individual instruction is given throughout. Pupils are required to furnish all materials except those used in making models in Course 5. A certain amount of work is required to be completed before admittance is given to the next higher grade of work.

DRAWING.

(Hayes Hall. Rooms 22, 24 and 37).

Professor Bradford, Assistant Professor French, Mr. Lewis.

1. **Freehand Drawing**. Practice and occasional lectures. Practice in pencil, charcoal and pen drawing from models and plaster casts. Two drawing periods a week, first, second and third terms.

10. **Mechanical Drawing**. Lectures and practice. Elementary mechanical drawings, lettering and working drawings. Two periods a week, first term.

15. **Technical Drawing.** Lectures and practice. House planning. Two periods a week; second and third terms.

16. **Technical Drawing.** Lectures and practice. Designing, preparing working drawings and specifications for structures related to agriculture. Three periods a week; third term.

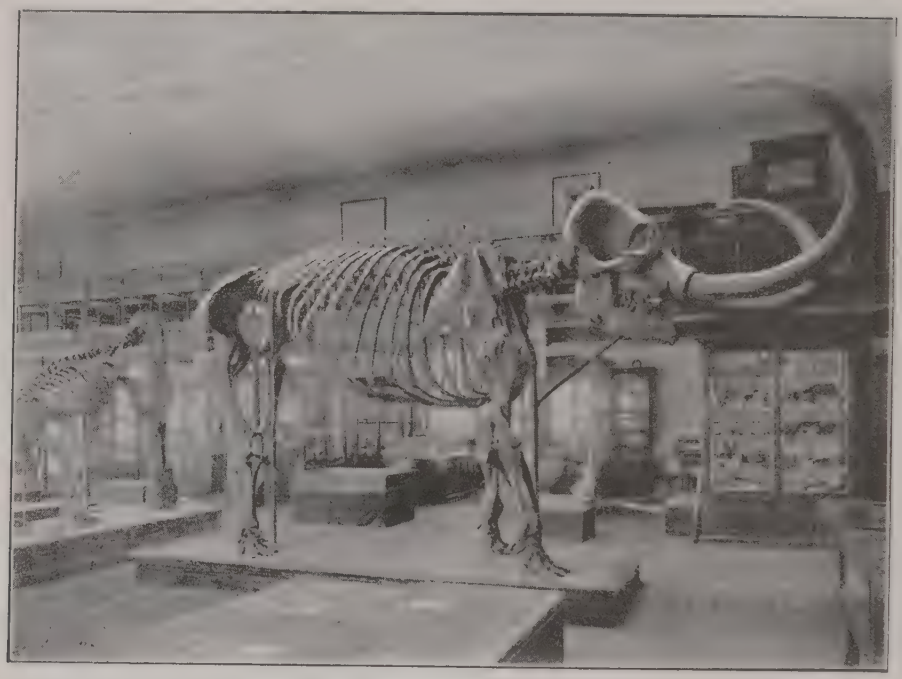
ART

An elective course in Art offered by Department of Drawing. Must be preceded by Course 1 in Drawing or its equivalent elsewhere.

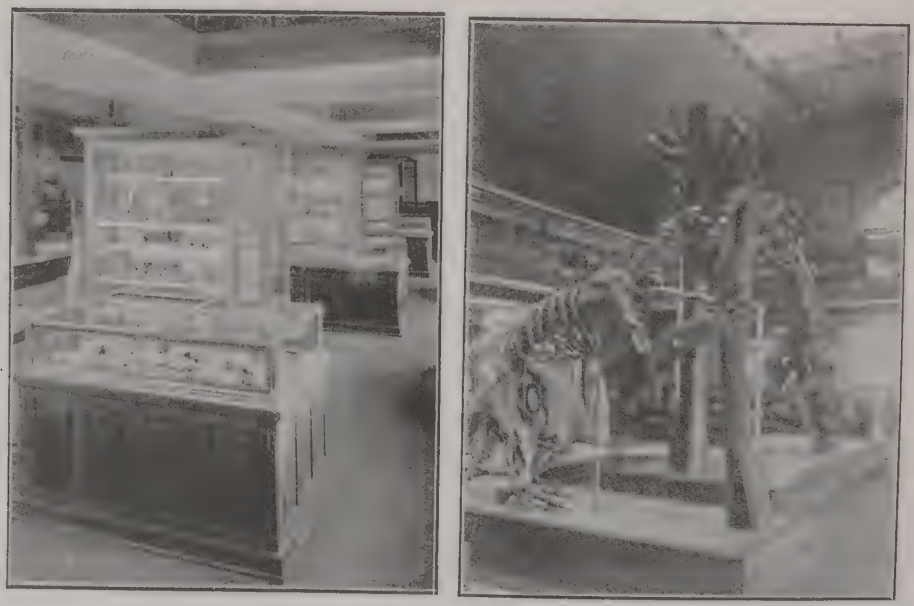
17. **Lectures and Practice.** Lectures on color standards, color theory, color harmony, color appearances, tone and graduation, atmosphere and values. Practice in color work either water or oil color. First term. Lectures illustrated by lantern slides.

18. **Lectures and Practice.** Lectures on objects of art, ideas and subjects, style and individuality, schools of art, great artists including old and modern masters. Illustrated by lantern slides. Practice in water or oil painting from still life. Second term.

19. **Lectures and Practice.** Lectures will be a continuation of second term's work and including sculpture and the master sculptors. Illustrated by lantern slides. Practice in water or oil painting from life and nature or clay modeling. Third term. The above is to be offered as an elective for two or three hours as follows: Lecture for one hour and practice for two or four hours as the student has time.



GEOLOCIAL MUSEUM, ORTON HALL



GEOLOGICAL MUSEUM, ORTON HALL

ECONOMICS AND SOCIOLOGY

(University Hall, Rooms 17 and 18).

PROFESSOR CLARK; MR. SMYSER.

1. **Elements of Political Economy.** A careful study of the laws of production, exchange, distribution and consumption of wealth; combined with an analysis of the industrial actions of men as regards land, labor, capital, money, credit, rent, interest, wages, etc. Text-book, lectures and individual investigations. (a) Four times a week during first term and twice a week second term; or (b) Twice a week second term and four times a week third term.

EDUCATION

(University Hall, Rooms 51 and 54).

PROFESSOR GORDY, MR. HAMILTON.

1. **Educational Psychology.** This course is intended to be helpful to three classes of students: (1) Those who are not preparing to teach, but who wish to make some study of education in order that they may perform their duties as members of society more intelligently. (2) Those intending to teach and who wish to study the relations between psychology and education. (3) Those preparing to be superintendents and who wish to get suggestions as to the best method of teaching Psychology to teachers. Three times a week during the year.

ENGLISH LITERATURE

(University Hall, Room 31).

PROFESSOR BARROWS.

1. **An Introduction to English Literature.** This course includes: (1) An outline of the history of English Literature. For this part of the work Pancoast's "Introduction to English Literature," is covered by three examinations. (2) Lectures on the elements of literary analysis and interpretation. (3) Study of selections characteristic of different authors and of different periods, to secure acquaintance with literary problems, to cultivate perception of literary qualities, and to verify and apply the assertions of the lectures and of the manual. This part of the work will occupy most of the time in the recitation room. The book first used is Palgrave's "Golden Treasury." Twice a week through the year.

GEOLOGY

(Orton Hall)

ASSOCIATE PROFESSOR PROSSER, ASSOCIATE PROFESSOR BOWNOCKER.

2. **General Geology.** Structural, historical and dynamical geology Three hours lectures and recitations and four hours laboratory and field work. In the laboratory, Dana's Manual of Geology, the Ohio Geological Reports and characteristic fossils will be studied. In the field, specimens

will be collected, sections measured, formations identified and the student will be given an idea of the methods of work pursued by a field geologist. Credit five hours. First term.

5. **Economic Geology.** The common minerals and rocks composing the earth's crust, their disintegration and decomposition. Soils, their origin and classification; the soils of the United States and especially those of Ohio. Fuels, coal, oil, and gas. Building stones, limes and cements. Iron, and the most useful metals. Three hours. Second term. Lectures and laboratory work.

1. **Physiography.** The topographic features of the earth's surface and the agencies producing these. The atmosphere, climate, etc. Oceans, rivers and lakes. Recitations, lectures and map work. Five hours. Third term.

GERMANIC LANGUAGES AND LITERATURES

(University Hall, Rooms 30, 32 and 38).

PROFESSOR EGGERS, ASSOCIATE PROFESSOR MESLOH.

1. **Elementary.** Four times a week through the year.

2. **Science Reading.** Twice a week through the year.

4. **Intermediate German and German Literature.** Four times a week through the year. German 1, is required in the course in Agriculture in the third year. German 1 and 4 are required in the courses in Horticulture and Domestic Science in the second and third years respectively. German 2 or 4 may be elected by students in Agriculture who have finished 1. German 2 or 9 may be elected by Students in Horticulture and Domestic Science who have finished previous courses, i. e., 1 or 1 and 4, respectively.

9. **Classical Drama and Prose.** Three times a week. Three terms.

HISTORY

AMERICAN HISTORY.

(University Hall, Rooms 27 and 18).

PROFESSOR KNIGHT, MR. A. H. TUTTLE

1. **Political History of the United States.** Lectures, text-books and prescribed readings. Hart's Formation of the Union; Wilson's Division and Reunion. (a) Four times a week during the first term and twice a week second term; or (b) Twice a week, second term and four times a week, third term. Two sections. The aim of this course is to give the student such knowledge of the political history of the United States as shall make for intelligent citizenship and a clearer understanding of current political conditions.

HORTICULTURE

(Horticultural Hall)

PROFESSOR LAZENBY, MR. PRICE.

1. **Elements of Horticulture.** Lectures, text-book and laboratory work in garden, orchard and green-house. A study of the principles of plant growth and culture, preparation of soil, drainage and irrigation, weeds and insects. Four times a week. First term.

2. **Greenhouse, Construction and Management.** A study of the different types of plant houses, including methods of heating, ventilating and watering. The vegetable forcing house, and the crops grown therein. Lectures, recitations and laboratory work in greenhouse. Four times a week. Second term.

3. **Plant Propagation.** The theory and practice of multiplying plants by seeds, cuttings, divisions, layers, budding and grafting. A study of special garden crops, including fertilizers, tools and implements. Practice in transplanting, pollinating and the use of insecticides and fungicides. Lectures and laboratory work in garden and orchard. Four times a week. Third term.

5. **Varieties of Fruit.** A study of the history, characteristics, adaption and general qualities of orchard and garden fruits, including their commercial and food value. Practice in judging and scoring apples, pears, peaches, grapes, citrous and nut fruits. Lectures, recitations and laboratory exercises. Four times a week. First term.

6. **Principles of Fruit Culture.** A study of the location, tillage and fertilizing of fruit lands; the selection of varieties, laying out and planting of fruit grounds; the care of fruit plantations, including diseases, insects and fungi; spraying and the use of insecticides and fungicides; harvesting, preserving and marketing fruit. Lectures and recitations four times a week. Second term.

7. **Small Fruit Culture.** A study of the varieties and methods of culture of the small or bush fruits. Practice in cross-pollinating, judging and scoring of small fruits; the relation of bees and birds to horticulture; insect enemies; fungus diseases and the theory and practice of spraying. Lectures, recitations and laboratory work in garden and orchard. Four times a week. First term.

8. **Elements of Floriculture.** A study of the origin, history, classification, general characteristics and development of ornamental plants. Lectures and laboratory work. Twice a week. First term.

9. **Commercial Floriculture.** A study of the propagation and culture of ornamental plants, including the general management of plant houses, the marketing of cut flowers and bedding plants. Lectures, recitations and laboratory work. Twice a week. Second term.

PRACTICAL LESSONS IN SPRAYING, DEPARTMENT OF HORTICULTURE

STUDENTS ROOT GRAFTING, HORTICULTURAL HALL

10. **Amateur or Home Floriculture.** Including the study of window gardening and general management of house plants; the out door flower garden and treatment of flower beds and borders. Lectures, recitations and laboratory work. Twice a week. Third term.

11. **Arboriculture.** A study of native and introduced trees and shrubs; their use for timber, ornament, shade, shelter and hedges; methods of propagation and culture. Lectures and field work. Twice a week. First term.

12. **Forestry and Sylviculture.** A study of the influence of forests upon soils, crops and climate; forestry in Europe; value of trees for timber; establishment and management of small plantations of forest trees; how to improve and extend existing woodland. Lectures and laboratory work. Twice a week. Second term.

13. **Landscape Gardening.** A study of the art of producing picture-like or landscape effect; the making of lawns, walks and drives, and the correct planting of trees, shrubs and flowers for the external adornment of home and public grounds. Lectures and practice. Twice a week. Third term.

INDUSTRIAL ARTS AND SHOPWORK

(Hayes Hall, Rooms 9, 12, 17, 18, 5 and 6).

PROFESSOR SANBORN, MR. RENCK, MR. CROWE.

SHOPWORK

1. **Carpentry and Pattern Making.** Exercises and practice in carpentry, wood-turning and pattern making, including sawing, planing, mortising, splicing, framing and other work involving the use of the ordinary carpenter tools; center and chuck turning; the making of finished patterns; and enough elementary moulding to illustrate draft, parting, cores, etc. Second term. Two three hour periods a week.

2. **Forging.** Exercises and practice in iron and steel forging, including such operations as drawing, bending, forming, upsetting, welding and the making and tempering of punches, drills, chisels, lathe tools and springs. Second term. Two three hour periods a week.

MATHEMATICS

(University Hall, Room 45).

PROFESSOR BOHANNAN, ASSISTANT PROFESSOR ARNOLD, MR. MOORE.

1 **Elementary Algebra.** *Venable.* Five times a week. First term.

3. **Plane Geometry.** *Venable.* Five times a week. Second term.

THE CARPENTER SHOP, HAYES HALL

THE FORGE ROOM, HAYES HALL

MECHANICAL ENGINEERING

(Hayes Hall, Room 12; Mechanical Hall, Second Floor).
PROFESSOR MAGRUDER, ASSOCIATE PROFESSOR HITCHCOCK.

26. **Steam Machinery.** One lecture a week on the care of steam engines and boilers, pumps and injectors, and of ammonia refrigerating machinery. Course in Dairying.

MILITARY SCIENCE AND TACTICS

(Armory).
MAJOR CONVERSE.

1. **Military Drill.** Four times a week, first and third terms. Twice a week, second term.
2. **Tactics.** Lectures and recitations. Once a week. Second term.
3. **Art of War.** Lectures and recitations. Once a week. Second term.

PHYSICS

(University Hall, Room 14).
PROFESSOR THOMAS, MR. KESTER.

1. **Elementary Physics.** Recitations and experimental lectures. Five times a week. First and Second Terms. Text: Carhart & Chutes' "Elements of Physics". This course is required of students in the first year of the Short Course in Agriculture. Other courses in Physics may be elected by fourth year students in Agriculture. For description of such courses and of the equipment of the department, see general catalogue.

RHETORIC AND ENGLISH LITERATURE

(University Hall. Rooms 42, 40, 38 and 55).

PROFESSOR DENNEY, ASSISTANT PROFESSOR GRAVES, ASSISTANT PROFESSOR MCKNIGHT, ASSISTANT PROFESSOR ALLEN, MR. BOHN, MR. ABBOTT.

1. **Paragraph Writing and Analysis of Prose.** Three terms. Twice a week. Required.

21. **Essentials of Oral Discourse.** Three terms. Once a week. Credit one-half hour. Required.

2. **Expository Writing.** First term. Twice a week. Must be preceded by 1. Elective.

3. **Brief Making and Written Argumentation.** Second and third terms. Twice a week. Must be preceded by 1 and 2. Elective.

23. **Debates.** First and second terms. Two hours a week. Must be preceded by 3. Elective.

24. **Extempore Speaking.** Third term. Twice a week. Must be preceded by 23. Elective.

25. **Oratory.** Three terms. Twice a week. Must be preceded by 3. Elective.

10. **Advanced Composition.** (Individual work). This course is designed for upper classmen who desire to continue practice in some one of the forms of composition studied in courses 1, 2, 3, or who seek criticism of work intended for publication in newspaper or magazine. Each student will meet the instructor at stated periods for criticism and assignments. Course 10 may be undertaken at the beginning of any term. Credit one hour, limited to three terms. Elective.

ROMANCE LANGUAGES AND LITERATURES

(University Hall, Rooms 35 and 34).

FRENCH.

PROFESSOR BOWEN, ASSISTANT PROFESSOR BRUCE, MR. JONES.

1. **Elementary French.** Four times a week throughout the year. Grammar and reader, modern prose and plays. Grammar: Joynes' Minimum or Edgren's (Part 1) or Grandgent's Essentials, with written exercises. Reader: Super's (from Part 2) or Whitney's (Parts 1 and 2) or Laboulaye's Contes bleus. In this course the study of the language is taken up from the beginning. Stress is laid at first upon the acquisition of a correct pronunciation, after which the entire energy of the student is directed toward the attainment of a full and accurate reading knowledge of the language. Grammar and composition are made to contribute to this end. After the completion of the reader, historical and narrative prose works are taken up, followed by the study of one or more prose comedies. All the works read are taken from nineteenth century literature. As the texts used vary from year to year, no special volumes or editions are here cited. Toward the close of the year sight reading is emphasized.

2. **Modern French Literature.** Four times a week throughout the year. The study of the literature as such is now taken up. The work of the year covers a survey of four fields: (1). Contes and Historiettes; (2). The Novel (Balzac, Eugenie Grandet); (3). Lyric Poetry (Bowen's Modern French Lyrics); (4). The Drama; Comparative study of the classical and romantic drama (Corneille, Horace; Hugo, Hernani). Private reading is also required, covering selections from the short stories of Daudet and an episode from Hugo's Les Miserables. The work is supplemented by lectures; these include a general survey of French literature from its beginning, together with special lectures on Balzac, Victor Hugo, Corneille and the classical and romantic drama. During the first half year one hour a week is also given to practical work (prose composition, conversation, study of syntax and idiom, as found in Chardenal's French Exercise for advanced students). This course is open to those who have completed Course 1, or who have received credit for French as an entrance subject.

VETERINARY MEDICINE

PROFESSOR WHITE, DR. FREDERICK.

28. **Veterinary Anatomy.** Special course for students in agriculture. Brief outline of the anatomy of the horse and ox. First term. Lectures and recitations four times a week. Clinical practice once a week.

29. **Veterinary Practice.** The more common diseases of a non-infective character, to which farm animals are subject. Minor surgery, castration, and the principles of horseshoeing are included in this course. Second term. Lectures and recitations four times a week. Clinical practice once a week.

30. **Veterinary Practice.** The more common infectious and contagious diseases affecting farm and dairy animals, and the most scientific methods of preventing, dealing with and treating the same. Third term. Lectures and recitations four times a week. Clinical practice once a week.

17. **Diseases of the Cow.** Special course for students in Dairying. Lectures and demonstrations consisting in the following: (*a*). Anatomy of the cow with special references to the digestive, reproductive and milk-producing organs.. (*b*). The more common non-infectious diseases of these organs and their treatment. (*c*). Most important infectious and contagious diseases and methods of preventing and dealing with them. (*d*). Practical methods of administering medicines, securing during operations, casting, etc. Second term. Three hours per week.

*ELECTIVES

Veterinary Medicine (11; 12; 13) 5. (Anatomy) First, second and third terms. Veterinary Medicine (14; 15; 16) (General Pathology and Theory and Practice). Five times a week throughout the year. This Course should be preceded by Veterinary Medicine (11; 12; 13) 5 and by Physiology (1) 3. Veterinary Medicine (19) 3. (Horse, Cattle, and Dog Clinic in the Veterinary Hospital). Daily, including Saturdays, 10—12 M. First, second and third terms. Veterinary Medicine (21—22) 3. (Infectious and contagious diseases). First and second terms. Veterinary Medicine (23) 3. (Obstetrics). Second term. Veterinary Medicine (26) 3. (Principles of Horseshoeing). Third term.

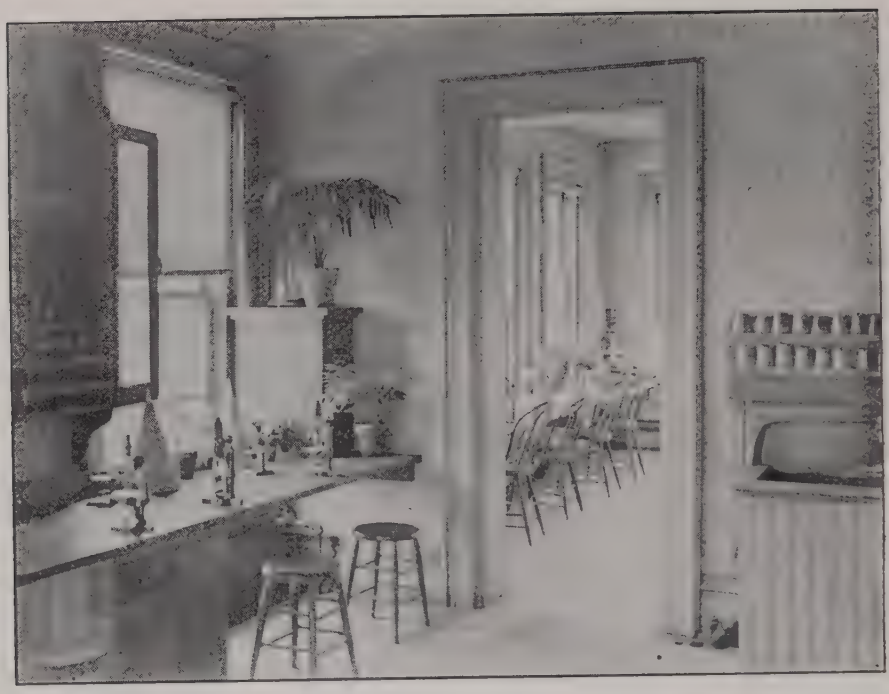
ZOOLOGY AND ENTOMOLOGY

(Biological Hall, Rooms 3, 4, 7, 8 and 9).

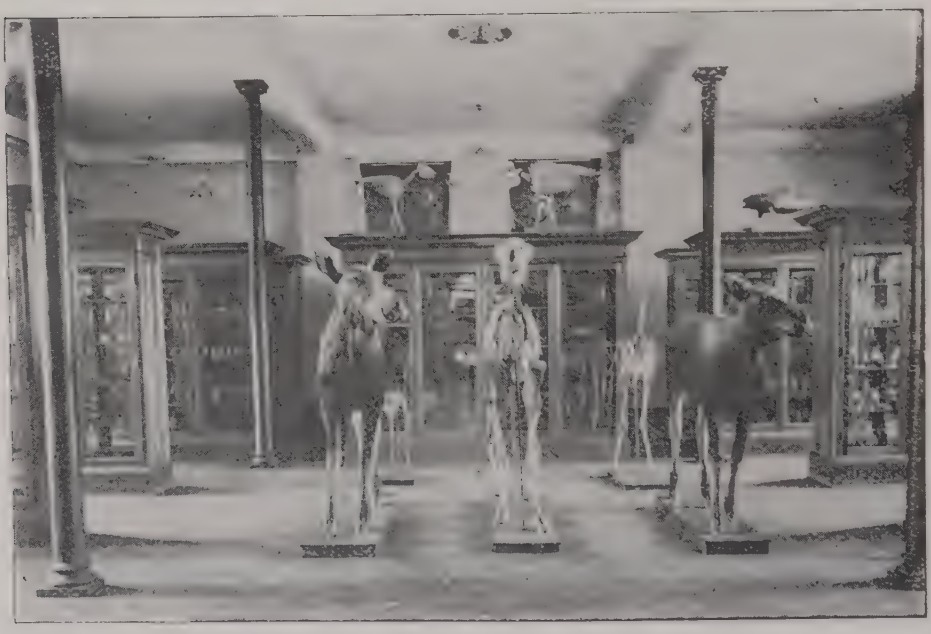
PROFESSOR OSBORN, ASSISTANT PROFESSOR HINE, ASSISTANT PROFESSOR LANDACRE.

1. **Invertebrate and Vertebrate.** Three times a week. Invertebrate, first and second term; Vertebrate, third term. This course includes a

*Although the above electives are especially recommended, agricultural students who have had Anatomy and Physiology may elect any subject taught in the College of Veterinary Medicine.



A CORNER IN THE BOTANICAL LABORATORY



ZOOLOGICAL MUSEUM, BIOLOGICAL HALL

general discussion of groups, dissection of types and an outline of classification. Especial attention is given to forms of economic importance either from their detrimental effects on crops, stock, etc., or from their utility in various industries or as domestic species.

3. **Economic Entomology.** Insects of Forest, Orchard and Garden. Five times a week. Third term. A detailed study of injurious species intended particularly for students of Horticulture. The work includes field studies, collections, reports on observation, etc.

4. **Economic Entomology.** Twice a week, through the year. This Course must be preceded by Course 1. A systematic study of the group of insects with special reference to injurious and beneficial species. A foundation is laid for special study in Entomology. Preparation of collections, essays, life history studies and use of remedial measures along with laboratory studies on general anatomy and class recitations and lectures

7. **Systematic and Practical Entomology.** Two lectures and one laboratory period a week. Third term. An elementary practical Course for students in the Short Course in Agriculture.

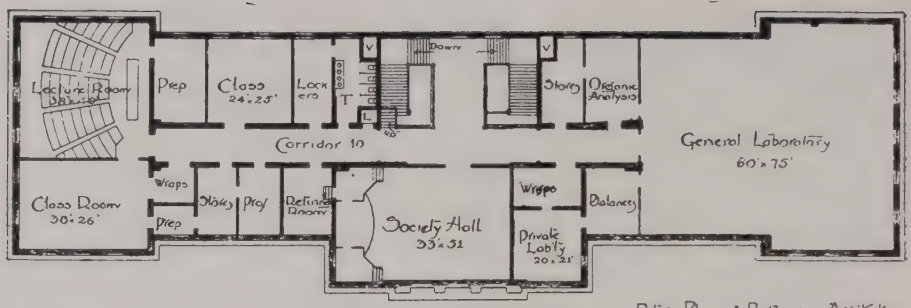
8. **Parasites of Domestic Animals.** A lecture course devoted to the principal parasites affecting domestic animals intended especially to meet the needs of those who intend to give particular attention to stock raising. Once a week. First term.

9. **Special Entomology.** Studies of life-histories, collection and classification in selected groups. Field work and lectures. Four periods each week. Elective. Fall term.

10. **Special Entomology.** Studies of winter condition of insects. Insecticides, insecticide machinery, methods of preparing insect illustrations, greenhouse pests, etc. Four periods each week. Elective. Winter term.

11. **Special Entomology.** Investigations of selected groups or species. Lectures on insect legislation, distribution, natural enemies, special methods of control, etc. Four periods each week. Elective. Spring term.

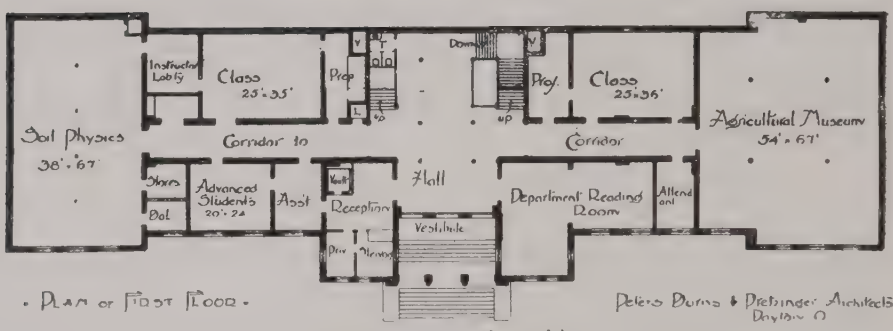
Courses 9, 10 and 11, are intended as practical courses in entomological research adapted especially for those who wish to give special attention to this branch with reference to future work in Agriculture or Horticulture and to furnish a preparation for those who have in view work as entomological investigators in experiment stations or as teachers in agricultural schools. They may be taken as graduate courses if not elected earlier or continued as special lines of research during a graduate course embracing other special subjects.



Peters, Burns & Dretzinger, Architects

- Plan of Second Floor -

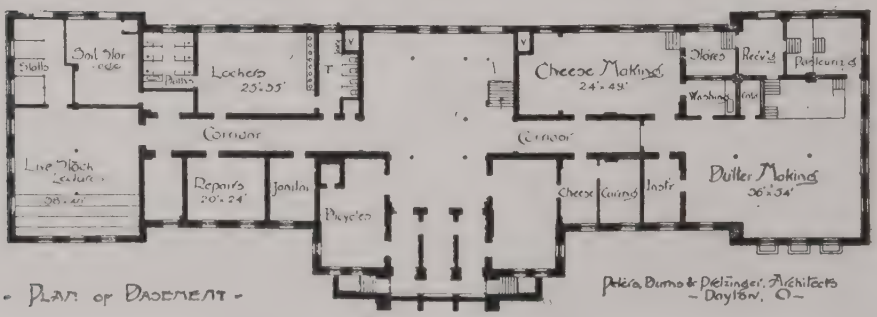
- Townshead Hall - Ohio State University -



Peters Burns & Dretzinger Architects
Dayton O

- Plan of First Floor -

- Townshead Hall - Ohio State University -



Peters, Burns & Dretzinger, Architects
Dayton, O

- Plan of Basement -

Townshead Hall - Ohio State University -

EQUIPMENT AND FACILITIES FOR INSTRUCTION

Agriculture. This department is located in Townshend Hall, headquarters for the College of Agriculture and Domestic Science, which was completed in 1898 at a cost of $100,000. This agricultural building is named after that illustrious pioneer in "education for agriculture", the late Dr. N. S. Townshend, who for twenty-five years was professor of agriculture in the Ohio State University, and who, in 1854, associated himself with James Dascomb, John S. Newberry, and James H. Fairchild, in establishing the "Ohio Agricultural College" at Oberlin. Townshend Hall is a memorial to his public services and his work in advancing the cause of agricultural education.

Townshend Hall is 260 feet long, and varies in width from 64 to 78 feet. It contains two stories, and a basement which is fourteen feet high, making the building practically three stories high. The walls above the basement line are of gray pressed brick. The basement walls and the front entrance are of Bedford, Indiana, Oolotic limestone and the trimmings are of terra cotta of the same color as the brick. The roof is of dark red tile.

The building is of slow burning construction throughout with painted interior brick walls, exposed beams, maple floors, and hard pine finish. Throughout the dairy department, which has about 6,000 square feet of floor space, the floors are of tile and the walls enameled brick. The floor plans on the page opposite show the arrangement of offices, class rooms and laboratories.

The department is supplied with apparatus for studying the effect of grade angle, height of obstruction, height of hitch, size of wheel and weight of load on draft of wagons. A large model shows correct and incorrect methods of making and using the doubletree. A wooden model demonstrates the effect of high and low hitch and width of hock on the pulling capacity of the horse. A self registering dynamometer is used to determine the draft of vehicles and farm implements under varying conditions, a number of implements being kept for this special purpose. Drainage levels are used in leveling and laying out tile drains. The Agricultural Museum contains many of the latest patterns of farm machinery, including self binders and mowers from all of the leading manufacturers. In the study of soils, the large glass house with its equipment of railroad tracks, trucks and pots

affords opportunity for the student to test the adaptability of crops to various soils; the fertilizer requirements of soils and to experiment on various other problems of crop growth. The soil physics laboratory is supplied with apparatus for studying the specific gravity of soils; volume weight of soils; power of loose soil to retain moisture; power of compact soil to retain moisture; rate of flow of air through soils; rate of percolation of water through soils; effect of mulches on evaporation of water from soils; effect of cultivation on evaporation of water from soils; power of dry soil to absorb moisture from air; and the capillary rise of water through soils. Mechanical analyses are also made of typical soils.

In the study of crops, large use is made of the collection of dried specimens of grasses, grains, and seeds. The grass garden contains about twenty-five varieties of grasses and clovers, growing side by side where comparisons may be made as to the value of each for pasture, meadow and grass. The farm is visited frequently by the students who make observations and studies of the practical methods there employed in the growing of crops and in the feeding and management of live stock. The live stock judging room is supplied with implements for precise measurement of animals and with score cards of all the different types of domestic animals. The students are here given opportunity to study every detail of conformation. The animals used are selected from the University farm or are contributed from time to time by the breeders of the state. Some of the best animals of their kind in the state have been brought here for the students to study. Numerous excursions are also made to the farms of leading breeders, both for the purpose of studying types and methods. The class room is provided with a stereoptican and a large collection of carefully selected lantern slides of the leading individuals of several breeds of live stock. The herd books of the several breeds are made use of in familiarizing the students in methods of tracing pedigrees and the practices of breeders' associations.

The dairy laboratory has one of the finest equipments in the country. In the spacious creamery room are a dozen different styles and sizes of cream separators and the student is enabled to obtain a thorough knowledge of the mechanism and efficiency of this class of machinery. There are also half a dozen styles of churns and butter workers of different types including some of the latest inventions. A number of hand power and steam turbine milk testers are supplied for testing milk and the products therefrom. The work of the student in this part of the dairy laboratory is checked up each day by means of eleven different report blanks, which the students are required to fill out and hand to the instructors in charge. The room in which the bottling, and pasteurizing of milk and cream is carried on is an exceptionally fine one. In it are vats, wash-sinks, separator, two styles of pasteurizing machinery, bottling apparatus and a large steam sterilizing oven. The cheese department has the use of spacious, well-lighted, making room and curing rooms. In the equipment are vats, three styles of presses, curdmills, etc., for the manufacture of Cheddar cheese, and the necessary

apparatus for making brick and Edam cheese. Students in this part of the work make daily reports on five different forms of blanks. In an adjoining power house are found a boiler, two engines, pumps, and refrigerating machinery, which are operated by students under the direction of an instructor. The student is taught to make the best possible product with the least loss of raw material, and to handle the machinery carefully. Important points in the work are drawn out in the class rooms by means of lectures, recitations and written examinations.

Agricultural Chemistry. The department of agricultural chemistry occupies the greater part of the second floor of Townshend Hall. The main students' laboratory is at present fitted up with ninety-two desks, and when completely fitted up will accommodate one-hundred and fifty students. Each desk contains a complete outfit of apparatus and chemicals necessary for the work in hand. The outfit in each desk is secured by combination locks. Special apparatus and chemicals are supplied from the store room. Each desk is supplied with gas and water. Hoods for evaporation and generation of noxious gases and liquids are conveniently arranged on both sides and one end of the laboratory. From the main laboratory, easy access is had to the balance of the room and private laboratory of instructor on one side and to the organic analysis and assistant's room and store room on the other. A room entirely detached from the main laboratory is fitted up for water analysis and for the polariscopic determination of sugar. The lecture room is capable of seating one-hundred and fifty students. In connection with it is a preparation room, which is supplied with the necessary apparatus and specimens for illustrating the lectures. This floor also contains a resting room and a toilet room for young women.

Bacteriology. The first half of the term, during which this subject is taught, is taken up by lectures and recitations, the latter half is given to laboratory work. Bacteria are first studied in a general way and in their general relationship to man and his surroundings. Then is taken up a more specific study of their influence and work in soils in higher plant growth and in animal life, together with their important and manifold performances in milk, butter and cheese. In the laboratory is taught the preparation of culture media, the methods of study for bacteria, the isolation of pure cultures and the numerical examination of water, milk and air. A special room is set apart for this work provided with incubators, sterilizers and all other necessary apparatus. Students so desiring may elect advanced work along the lines indicated.

Botany. The department offers good facilities for instruction and investigation. The Botanical Building contains a large lecture room, Museum, Herbarium, three laboratory rooms, dark room, drying room, store room and offices. The lecture room will, the coming year, contain a stereoptican furnished with electric light; a large number of charts, many of them colored lithographic, photographs and mounted illustrative

specimens are the other principal appliances for daily class work. In this room are placed fifteen of the more important popular journals of Botany for the use of students. The Botanical books in the University Library, a valuable and growing collection, are largely used for reference in connection with the several courses. The Museum contains a large amount of illustrative material; the native medicinal plants and the collection of Ohio woods being very complete. The State Herbarium consists of between twelve and fifteen thousand sheets of Ohio plants. The general herbarium is much larger. Professor Kellerman's private herbarium of twenty thousand specimens, mostly parasitic fungi, is also used by the Department. The large laboratory is well equipped with dissecting and compound microscopes; also the usual appliances for doing both elementary and advanced histological work. One of the small laboratories is devoted to experimental work in vegetable physiology and the other to systematic Botany. The green-house attached to the Botanical building is an important adjunct to the department. There are four sections containing a total of nearly 3,000 feet of glass. It contains a large number of illustrative plants, about 3,000 specimens representing the principal plant families and belonging to several hundred species. The green-house furnishes much fresh material for laboratory use. It is also used as a laboratory to carry on special work when growing plants are used.

Domestic Science. The periods devoted specifically to the study of Domestic Science are quite fully outlined in the preceding pages and it seems unnecessary to elaborate here. Sufficient to say that the course aims to supplement the work of other departments and to apply it to practical home life. The study of Botany, Zoology, Chemistry, Physiology and Bacteriology makes it possible for the student to understand the functions of various organisms and to appreciate the changes constantly occuring in plants and animals. The needs of the body in a superficial way have long been taught, but it is imperative that every one who attempts to maintain life at its best, should know definitely what is required for a human being and how to provide it. A woman should be conversant with the food principles, know where they are to be found, in how large proportion they should be supplied, how they are best prepared for consumption and the effect of each in the body. In a general way she should be able to analyze disease and be prepared to guard against it. Again sociology has an especial bearing upon home life; the personal assistance given to individuals, either in the home or by means of charities, is largely delegated to women and they might accomplish far more for humanity if they gave less outright and were prepared to teach the dependents better means of helping themselves. Industrial activities demand consideration. The consumptive side of Economics is as important as the productive side and belongs to women. They should know absolute values, from every standpoint, and this knowledge does not come by studying text-books, but by actually dealing with things. The home is founded on and protected by sanitary and

hygienic laws and the mastery of them is quite within the province of every woman, when competent teachers are prepared to expound them. Their study is of no less interest than that of other sciences and every science and art is made more vital and more fascinating by a knowledge of some definite way in which it may be applied.

Domestic Art. The object of this course is to give the student an insight into that cultural development of the race which has been gained through handwork. The work is taken up along advanced educational lines; the value of manual training is emphasized and an effort is made continually to correlate the subjects taught in the Department of Domestic Art with other College work, such as History, Botany, Literature, Anthropology, Sociology, Economics, Drawing, etc. It is felt that too much stress cannot be laid upon the development of character as gained through manual training, and besides giving that deftness of hand which is a needed accomplishment with every woman. It is believed that that education is incomplete which fails to develop the native artistic abilities of the pupil and give to her a training in ways and means of usefulness which shall make her succeed when she enters the world as home maker or wage earner. Too many women are useless drones in society, burdens in the home or the world at large because they have so few resources; they have not learned to adapt knowledge or to work out with their hands the useful and artistic ideas held in the mind. Emerson says: "The creation of beauty is art, and the love of beauty is taste." To develop good taste, is to insure homes of taste, and this implies architectural beauty of the house proper, artistic decoration of the interior and harmonious dressing of the inmates. Manifestly this involves the study of a number of subjects, all of which bears more or less directly upon the Domestic Arts. Taking as our ideal the thoroughly rounded character, the well developed woman physically, mentally and morally, we must add to all other knowledge those touches of grace, given perhaps more especially than by any other lines of study, through a study of Art. It is through Art study that we come to appreciate beauty in line, form and color by applied work, following the recognized principles of the best artists we are able to develop originality and skill in ourselves. The work of the Art Department and the work of the Domestic Art courses are being arranged more and more to complement each other, and besides the technical training in sewing necessary as a foundation to the right treatment of fabrics, the course is simply applied work in Art—'Art in every day relations.'

Drawing. The Department occupies the entire third floor and one room in the basement of Hayes Hall, and is provided with the following equipment for the illustration of the work in drawing and for practical training in the same:

For freehand drawing, water color and oil painting:—A large studio, thirty-five by eighty feet, specially arranged and provided with adjustable

tilting tables and easels, a well selected collection of pencil, pen and ink, charcoal and color specimens of work, wooden models of geometric forms, plaster casts of ornaments, flowers, fruit and the antique, and materials for "still life."

For clay-modeling :—A specially arranged and equipped studio, twenty-six by thirty-two feet, for modeling in clay and casting in plaster, consisting of modeling stands, moisture box, casting table, modeling tools of wood and steel, stove and vent-hood for the preparation of gelatine molds, and lockers.

For mechanical drawing and mechanical architectural designing :—A large, well-lighted room, forty by eighty-five feet, provided with O. S. U. drawing tables (30 by 36 inch tops), a set of Schroeder models, a collection of shop drawings and facilities for blue-printing.

For photography :—A well arranged and equipped dark room, printing apparatus, copying cameras, seven view cameras, lenses of long and short focus, telephotographic lens, shutters for instantaneous exposures and an excellent outfit for photo-micrography.

In addition to the above, the library contains a well selected collection of books pertaining to the work of the Department.

Geology. The University is able to present unusual advantages for the study of Geology. By an act of the Legislature it has been put in possession of all the collections made by the late geographical survey, and these collections have been supplemented by valuable additions of fossils and minerals from various sources. The State collection embraces a very complete representation of every geological formation shown in Ohio. Orton Hall, completed at a cost of more than $100,000, is designed for the permanent accommodation of the large geological collection of the University and for the work and instruction in the Department of Geology. A portion of it is occupied by the library and reading room. The building is two stories in height, with a high basement, is built of brick and faced with sandstone, and is fire proof throughout. Some of the material was contributed by various quarries of the State of Ohio, and almost all of the finer varieties of Ohio building stone are represented in the columns, walls and ceiling panels of the vestibule. At the right of the main entrance is the geological lecture room ; at the left is the University library and reading room. The central and rear portion is occupied by the geological and paleontological museums. In the basement the economic museum is located. On the second floor is located the stratigraphical and petrographical laboratories and the archeological museum.

Germanic Languages. The department possesses as aids in illustrating and supplementing the work, the following collections : Complete sets of maps of European and specifically Germanic countries ; a large number of illustrated volumes, showing the various phases of the arts and sciences, costumes and manners, public instruction, dramatic representation, etc., in

Germany at different epochs. The collection is the largest of its kind in the State; a number of photographs of the leading authors of Germanic Literature.

Horticulture and Forestry. This department has under its immediate control about twenty-five acres of land. About one-half of this area has been planted with numerous varieties of cultivated fruits. The remainder is devoted to market gardening. Students have an opportunity of observing all the operations carried on from the sowing of the seed and transplanting, to the harvesting and marketing of the crop. Among the facilities for instruction and illustration that deserve special notice are two vegetable forcing houses with packing rooms, tool rooms, etc. These houses are attached to Horticultural Hall, and are each one hundred and twenty feet long by twenty in width. They are heated by hot water. One interesting feature in the management of the forcing houses is the method of watering by subirrigation. This method had its origin in these houses and marks a great step in advance in green house management. Lettuce, radishes, cucumbers, parsley, cauliflower, onions, rhubarb, asparagus and other vegetables are grown in the forcing houses during the college year. Among the additional facilities provided for the illustration of the different courses in the department, and for practical training in the same are (1) orchards, containing well selected varieties of apple, pear, plum, cherry and quince: (2) a small vineyard, containing some of the standard varieties of grape; (3) small fruit plantations, stocked with some of the best varieties of strawberry, raspberry, blackberry, currant and gooseberry; (4) large vegetable gardens, with pipe-heated hot-beds, cold frames, conveniences for irrigation, experimental plats, etc.; (5) a small nursery and forest tree plantation, with practice rows for budding, grafting, pruning and training; (6) ornamental grounds and native woodland, containing a large variety of evergreen and deciduous trees and shrubs; (7) a green-house, with an extensive collection of exotic plants; (8) a collection of seeds, woods and other preserved natural specimens; (9) a collection of fruit in jars, also models of apples, etc.; (10) a laboratory well equipped with dry ovens, balances, seed testers, and other appliances for study and research; (11) a collection of horticultural hand tools for budding, grafting, pruning, etc.; (12) a small apiary of a dozen or more colonies of bees.

Mechanical Engineering. The Mechanical Engineering Laboratory contains a large collection of steam and gas engines, steam and power pumps, engineering instruments and apparatus, models of machinery, and samples of engineering supplies which are instructive and are open to the inspection of the students in Agriculture and Dairying.

Physics. The Department of Physics occupies the west half of the first and second floors and basement of University Hall. The equipment allows full experimental illustration and a wide range of individual work by the student in the laboratory.

Physiology. Instruction in this subject is given by lectures, demonstrations and recitations. Incidental to the main work so much of anatomy and histology is given as will render the processes going on in the living body comprehensible. A limited amount of laboratory work is introduced during the course so that the student may personally familiarize himself with the actual appearances of things discussed in the class room. The equipment for teaching and demonstrating in this department consists of numerous Azoux and other models, charts, physiological apparatus, skeletons, microscopes and other accessories ample to meet all requirements for thorough instruction.

Romance Languages. The department possesses, as aids in illustrating and supplementing the work, the following collections: Complete set of maps, including map of Paris; illustrated volumes showing the various phases of the arts and sciences, costumes and manners, public instruction, dramatic representation, etc., in France at different epochs; large photographs and engravings of the principle French writers; collections of French prose extracts for use in sight reading.

Shopwork. The shops, which occupy the north wing of Hayes Hall, afford excellent facilities for instruction in both the practical details and the underlying principles of carpentry, pattern-making and forging. The carpenter and pattern shops are equipped with twenty five benches with complete sets of carpenter tools for each and a large number of special tools for general use, twenty-three pattern makers' turning lathes with cupboards containing the necessary turning and pattern-making tools under each, a pony planer, a buzz planer, a circular rip and cross-cut saw, a scroll saw, a trimmer and a power grindstone. The forge shop is equipped with twenty stationary forges with anvils and tools for each, a heating forge, a portable hand forge, a foot power hammer, a blacksmith's drill and punch, shear and bar cutter. The blast for forges is furnished through underground piping by a 45" Buffalo pressure blower, and the smoke is removed by a 55" Buffalo exhaust fan over head. Both of these fans are driven by a 15-horse-power electric motor.

Veterinary Medicine. Students in Agriculture taking required or elective work in veterinary medicine can avail themselves of the whole equipment of the College Veterinary of Medicine. For class room work a large number of papier-machè models, wet and dry anatomical specimens, sample horse-shoes, charts, diagrams and drawings, surgical instruments and apparatus are constantly employed to supplement text-book teaching in all classes. The Veterinary Hospital, a plain brick building, affords excellent facilities for the care and treatment of diseased and injured animals, giving the students an opportunity to become familiar with and learn practically the maladies to which domesticated animals are subject. It contains box stalls, stalls for cold water application, a large and well lighted operating hall and two special wards for smaller animals. A drug dispensary and

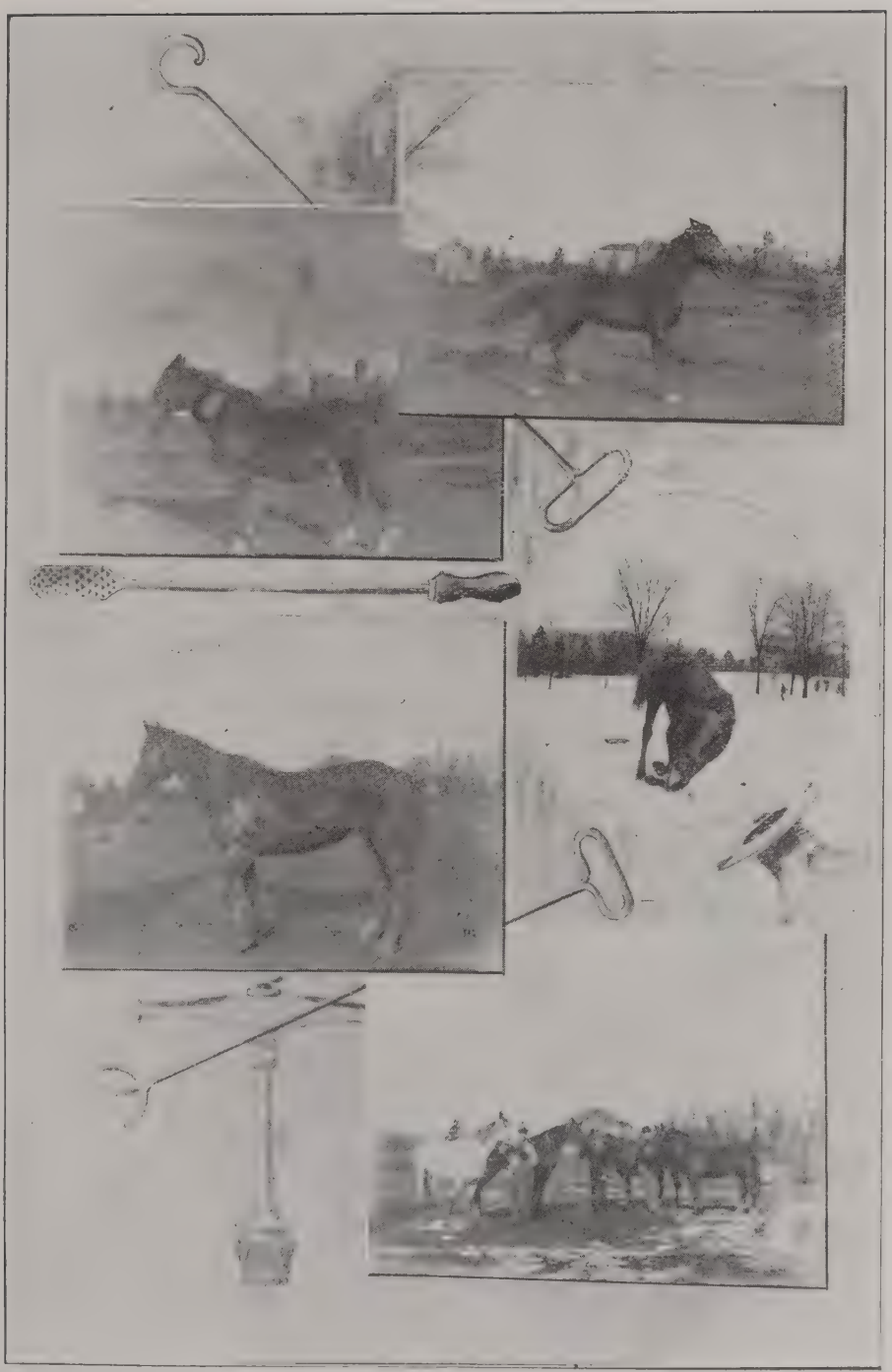
DAILY CLINICS AT VETERINARY HOSPITAL

A PRACTICUM IN PHYSICAL DIAGNOSIS, VETERINARY HOSPITAL

office with telephone are on the first floor front of the building. The upper floor is occuped by the house surgeon and two students selected from the senior veterinary class, who have immediate charge of the animals left for treatment. The free clinic is held for two hours daily (Saturday included) at this building. During the clinic hours agricultural students taking Veterinary Medicine (29 and 30) and those electing Veterinary Medicine (19), are required to assist the instructors in all surgical operations (castration, spaying, examinations for lamenesses, dental work, etc.) and to administer all medicines to sick animals, under the direction of the hospital staff. Inasmuch as from 1000 to 1500 animals are treated annually at this clinic, the students have ample opportunity to learn in a practical way the best methods of treating diseased and injured stock. A herd of fifty cattle, a drove of hogs, and several horses kept on the University farm furnish clinical material during the college year. The dairy herd is tested with tuberculin once a year, to determine if tuberculosis be present. The students conduct this test, under direction of the veterinary instructors, thus learning by actual doing, the modern method of diagnosing latent cases of bovine consumption.

Zoology and Entomology. Work in this department is largely on the laboratory plan, the effort being to have each student become familiar with typical forms of animal life, acquire the power to discover facts for himself and use them in practical applications. Animals that have an important economic relation are used as examples for their respective groups. While the aim is to give a thorough and sound training in the underlying principles of Zoology and Entomology, the practical bearing of these is shown by use of such forms as the liver fluke of sheep to show effects and relations of parasitism, the earthworm in its relation to soil formation, trichina as effecting human health and meat exports, insects, both useful and injurious, fishes as a source of food, relation of birds to insect control and importance of certain groups of birds and mammals as the source of our domestic animals. Advanced courses provide for training in methods of research and especial attention is given to preparation for investigation as experiment station workers in Entomology or Zoology. The adjacent fields, wood, lake and river along with various well equipped laboratories, museum and department library give abundant opportunity for study. The collections of skeletons, birds and insects are especially rich. The department occupies the first and third floors and part of basement in the new Biological Hall and is well provided with laboratory rooms and space for special lines of work. The Lake Laboratory maintained at Sandusky and open from June 15 to September 15 offers courses of instruction and exceptional opportunities for original research in Entomology and Ichthyology. Particulars regarding it may be had by applying for special circular.

Library. The University Library is a well selected collection of 32,000 volumes. The character of the collection is high and the students in all departments of University work find it an excellent working library. The



SNAPSHOTS FROM THE CLINIC, DEPARTMENT OF VETERINARY MEDICINE

books occupy the first, main, and balcony floors of the east end of Orton Hall and on each floor is to be found reading room space with comfortable chairs and tables. The shelves are all open, each student having the privilege of going directly to them, thus gaining familiarity with books which is a source of power the value of which can scarcely be estimated. The students are not thrown entirely on their own resources however, the reference assistants being always ready to help a student in looking up his subject and also to instruct him in the best methods of using the books for himself. The library is gradually accumulating sets of scientific serials and transactions which are of the greatest value to all scientific workers in whatever field. Its periodicals list at present numbers 305 The students in the College of Agriculture and Domestic Science have in some respects especially excellent library facilities. The majority of the books bearing on their work are to be found in the General Library, but there is also in Townshend Hall, a special department library and reading room. In the General Library are approximately complete sets of Agricultural Reports of all the states, of the Experiment Station Bulletins and of the Bulletins of the United States Agricultural Department: In addition there is a good collection of general works and of periodicals, treating on agriculture and its allied subjects. In the Department Library are kept the herd books, duplicate sets of United States Agricultural Reports, and Ohio Agricultural Reports, and a large number of papers. These the students can often read between classes, when there is not time to go to the General Library.

A WINTER SCENE ON THE CAMPUS

ADMISSION, ATTENDANCE AND GRADUATION

The entrance examinations for 1901 will be held on Monday, September 16.

Applicants for admission to the College of Agriculture and Domestic Science must be at least sixteen years of age, and must be provided with credentials of scholarship from their last instructors, or from the last institution with which they have been connected, and with a certificate of good moral character.

There are three modes of admission to the University :

1. Certificates of the preparatory departments of colleges of approved standing and of normal schools in Ohio are accepted, if found satisfactory, in lieu of examination for preparatory studies, under the following conditions :

Each certificate must contain a detailed statement of the studies pursued, the text-books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination, and the applicant's rank, or standing in it. A copy of the course of study, should accompany the certificate, and both should be sent to the University not later than the first of September. The University cannot promise this recognition to certificates presented during the entrance week.

Blank certificates will be furnished on application.

Applicants for admission who come from other colleges or universities, are required to bring certificates of honorable dismission.

Teachers' certificates (in force) will be accepted at their face value.

2. From time to time the University approves the courses of study in certain high schools of the State ; and the graduates of these high schools are admitted on presentation of cards issued to them at their graduation through their principals.

3. All other applicants are subject to examination on the group of studies mentioned below.

Full equivalents for text-books named will be accepted.

REQUIREMENTS FOR ADMISSION TO FOUR YEAR COURSES

The following are the requirements :

1. *Arithmetic, Descriptive and Physical Geography, English Grammar and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, *or equivalents:* Shakespeare's *Merchant of Venice, Julies Cæsar and Macbeth;* Milton's *Lycidas, Comus, L'Allegro,* and *Il Penseroso;* Burke's *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison;* The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

3. *Algebra*—Venable's Easy Algebra complete, or equivalent.

4. *Plane Geometry*—Venable, Wentworth, White or Wells, or equivalent.

5. *Botany*—Gray or Kellerman's Botany and Flora, or equivalent.

6. *Physics*—Gage, Carhart and Chute, Avery or Appleton, or equivalent.

7. Either of the following :

Civil Government—Fiske or Thorpe preferred.

History—Meyer's *General History*, or equivalent.

8. *Latin*—Pronunciation (the Roman method); Grammar (an exact knowledge of the inflections is essential); Cæsar, the first four books of the *Le Bello Gallico.*

Or French—The whole subject of French Grammar. Applicants will be expected to read at sight easy French and to translate correctly into French simple English sentences. Two years ought to be given to this study, the first year being spent mainly on the grammar with easy reading ; the second devoted to reading good modern French, with grammatical analysis and exercises in writing. The texts read should be chiefly narrative and conversational prose ; one or more prose comedies of the nineteenth (not the seventeenth) century should be included.

Or German — Joynes-Meissner's or Thomas' Grammar is recommended. The essentials in these grammars should have been mastered thoroughly, i. e., declensions of nouns and adjectives, pronouns, comparison of adjectives, prepositions, regular and irregular verbs and essentials of syntax.

The following books or their equivalent must have been read (not less than 300 pages).

Joynes' or Whitney's Reader, Hillern, Höher als die Kirche, Riehl, Der Fluch der Schönheit, Freytag, Die Volerne Handschrift, Gerstäcker Irrfahrten.

For the present, the *German or French* required for admission may be begun at the University, but without University credits.

Algebra, Plane Geometry, Botany, Physics and Physical Geography are taught as a part of the Short Course in Agriculture. See page 20. Students may prepare in these subjects for entrance to the four years courses by entering the Short Course in Agriculture.

REQUIREMENTS FOR THE SHORT COURSE IN DOMESTIC SCIENCE

The following are the requirements :

1. *Arithmetic, Descriptive and Physical Geography, English Grammar and United States History.*
2. *English*—(*a*) Composition and Rhetoric ; (*b*) English Classics.
3. *Algebra.*
4. *Plane Geometry.*
7. Either of the following :
   Civil Government.
   General History.

ADMISSION TO THE SHORT COURSE IN AGRICULTURE AND THE COURSE IN DAIRYING

Applicants must be at least sixteen years of age, and unless over twenty-one, must pass an examination in *Arithmetic, Geography, Grammar* and *United States History*, or bring high school or other certificates for those branches. The requirements for English Grammar in the Short Courses may be met by writing a business letter or theme on some practical subject. Applicants who are over twenty-one are admitted without examination.

ADMISSION TO SPECIAL STUDIES

Students who desire to pursue special lines of work in the University, and do not desire to become candidates for degrees, will be admitted on the following conditions.

1. The regular entrance requirements must be satisfied.

But applicants who are not less than eighteen years of age, after obtaining credit for elementary or "grade" work, and for such other subjects as may be necessary to qualify them for the classes that they wish to enter,

may, on the presentation of satisfactory reasons, be admitted by the Faculty to any class in the College; provided, that if any student who has been admitted on these conditions afterwards becomes a candidate for degrees, he shall take the omitted entrance examinations at least twelve months before the degree is conferred.

2. On entering the College, students desiring to pursue special work are required to lay before the Faculty, for approval or modification, a written statement of the end they have in view, the studies proposed for the attainment of that end, and the probable period of attendance. Such students will be held as strictly to their accepted schemes of work as are the regular undergraduates to their courses of study.

3. *Permission to enter as special undergraduates will be refused to all who fail to give satisfactory evidence of definiteness of purpose and will be withdrawn whenever the conditions on which it was granted cease to exist.*

ADMISSION TO ADVANCED STANDING

1. Applicants who do not come from some other university or college must first obtain admission in the manner already described. They will then be examined on the undergraduate studies for which they ask credits.

2. Applicants who come from the collegiate department of an approved college, and who bring explicit and official certificates describing their course of study and scholarship, and also certificates of honorable dismission, will be admitted without examination, except such as may be necessary to determine what credit they are to receive here for the work done in the college from which they come.

REGISTRATION

All students are required to register and pay their term fees on or before the first day of each term, between the hours of 8:00 a. m. and 12 m., or between 1:00 and 4:00 p. m., central standard time.

Former students who fail to register as above will be charged one dollar in addition to the usual incidental fee, for the first day of delinquency, and fiffy cents additional for each subsequent day.

No candidate for graduation will be permitted to register for the second term of his graduating year, except upon presentation to the Bursar, of the President's certificate that his thesis subject has been announced and approved.

AMOUNT OF WORK

No student is permitted to take less than fifteen credit hours a week of any sort of work, except by special permission, and no student will be permitted to take more than the regular work of the class to which he belongs, who has not passed all his work for the preceding term. A credit hour means one hour class room work in lecture, recitation or quiz, or two hours of laboratory work.

ELECTIVE STUDIES

All elections of work in continuous studies, when once made, are understood to be made for the entire collegiate year.

The right is reserved to each professor to withdraw the offer of any elective study when it is not chosen by at least four persons.

EXAMINATION AND STANDINGS

At the close of any term a student failing to pass in two-thirds of his work will be considered on probation; and a second similar failure will forfeit his connection with the University.

THESIS

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of this study must lie within field of the degree sought. The subject must be announced to the President of the University (dependent upon the approval of the head of the Department), not later than December 14th of the fourth year; and the completed thesis must be presented in duplicate, on standard paper of certain size and quality, typewritten, bound, and titled, not later than the second Saturday before Commencement Day.

DEGREES

The degree of Bachelor of Science in Agriculture is conferred on students who have completed the Course in Agriculture; that of Bachelor of Science in Horticulture and Forestry upon those who have completed the Course in Horticulture and Forestry; and that of Bachelor of Science in Domestic Science upon those who have completed the course in Domestic Science. Master degrees are conferred upon graduates of these courses at the end of not less than one year's residence, which shall be wholly devoted to the completion of an approved Course of study in the University. Each candidate is required in addition to present an acceptable thesis upon some subject connected with his Course of study.

THE CONVOCATION

At the opening of the year in September 1900, the daily chapel exercises were abandoned. As a substitute for the short daily exercise an entire hour is now devoted to a convocation at which the President presides. In addition to devotional exercises an address is delivered upon some suitable topic. During this hour the libraries and laboratories are closed and no other University exercises occur. It is expected that the Faculty and students will attend. The hour is definitely fixed at ten o'clock on Wednesday of each week. The public is always welcome at the Convocation.

THE CHAPEL

THE GYMNASIUM

AIDS TO MORAL AND RELIGIOUS CULTURE

One of the most commendable organizations in the University is a branch of the International Young Men's Christian Association, organized in 1883. This association is directly affiliated with the work for young men directed by the college department of the State Y. M. C. A. work. Services are held weekly and voluntary classes for Bible study are successfully organized. The local association has a secretary who devotes his entire time to work among the young men. The management has rented a house at 71 West Eleventh Avenue as a headquarters for the association. It is hoped that in the near future a permanent home for the association may be provided.

An equally commendable organization is the Y. W. C. A. affiliated with the State organization. Religious meetings are held regularly at noon on Tuesdays. Occasionally meetings for social purposes are held as provided for by the organization. Both of these organizations are worthy of public consideration.

New students are invited to write to the address below for a handbook of information concerning the University or for information concerning rooms, boarding or employment. Address, J. P. Davies, 71 West Eleventh Avenue, Columbus.

CADET SERVICE AND GYMNASIUM

From the opening of the year until the Thanksgiving recess cadet service is required four times a week; from Thanksgiving until the Spring recess cadet service is required twice each week and gymnasium practice twice; from the Spring recess until the first of June cadet service is required four times each week.

The gymnasium is free to all students but those desiring a locker will be charged a fee of one dollar a term.

LITERARY AND OTHER SOCIETIES

There are a large number of literary and technical societies and clubs which are open to the students of all colleges of the University. Among the literary societies are the Alcyone, Athenæum, Horton and Townshend Societies open to young men; and the Browning and Philomathean Societies open to young women. These societies have commodious and well furnished apartments. They meet weekly and their work, offering to the students a very desirable training in composition, public speaking and parliamentary order, is a valuable adjunct to collegiate education. Among the technical societies may be mentioned the Asparagus, Biological, Ornithological and Political Science Clubs. The O. S. U. Sketch Club promotes interest in art among the students of the University, while various musical organizations do the same service for music.

EXPENSES

COLLEGE DUES

Incidental Fee. Each student is required to pay an incidental fee of eighteen dollars a year and the usual fees for the expenses of laboratory work.

Laboratory Fees. Students in the laboratories and shops are required to pay fees to cover, in part, the cost of the material consumed, and the deterioration of the expensive instruments used by them. The fees charged per term in the laboratories mentioned below are as follows:

Agriculture 6	$10.00
" 15	5.00
Botany 6, 7, 8	2.00
Domestic Science	5.00
Shopwork	5.00
Zoology and Entomology	1.00

In the laboratory of the Department of Agricultural Chemistry, each student is required at the beginning of each term to pay a fixed charge of one dollar and fifty cents for gas and water. He is also required to buy his own supplies, which may be obtained at the store-room in Chemical Hall. With reasonable care, this expense need not exceed $5.00 per term.

All term dues must be paid at the opening of each term as a condition of admission to classes.

A fee of five dollars to cover expenses of graduation, diplomas, etc., is required of each person receiving one of the ordinary degrees from the University, and this fee must be paid before the degree is conferred.

For information concerning text-books, etc., address, F. R. West, Ohio State University, Columbus.

OTHER EXPENSES

There are two dormitories on the University grounds for the use of students. Each occupant is charged by the University a rent of a dollar and a half a term.

The South Dormitory affords unfurnished rooms for students who desire to board themselves and thus to reduce their expenses to a minimum. The expense of living in this way is about two dollars per week. Applications for rooms should be made to the President of the University.

The North Dormitory will accommodate more than sixty students. Board, furnished rooms, fuel, light and washing are, at present prices, supplied for about three dollars and fifty cents a week. Students will be admitted on special recommendation to the President of the University.

Boarding clubs are also formed in the neighborhood of the University. Furnished rooms are rented at seventy-five cents to one dollar a week for each student, and the cost of table board is two and one-half dollars to three and one-half dollars a week.

Board with furnished rooms can be obtained in private families, within convenient distances of the University, at rates varying from three and a half dollars to five dollars a week. The ruling rate may be taken as four dollars.

The uniform with which the members of the battalion are required to provide themselves costs (without overcoat) about fourteen dollars. It is quiet in pattern, and is designed to be worn daily in place of civilian dress.

The expenses of a student in the University for a year may be estimated as follows, excluding clothing (except uniform) and traveling expenses :

	Low	Average	High
Incidental fees	$ 18 00	$ 18 00	$ 18 00
Labaratory fees	15 00	20 00	54 00
Books and stationery	15 00	25 00	40 00
Room	4 50	37 00	75 00
Furniture	10 00	.....	.....
Board	70 00	110 00	150 00
Uniform	14 00	14 00	14 00
	$146 50	$224 00	$351 00

The second and third estimates for room include light, fuel and care. The third estimate is for a room occupied by a single student. The requirements for laboratory fees and books depend upon the course of study pursued. There is no need of a student spending more than the "average" for items mentioned ; many spend less.

FREE SCHOLARSHIPS

A free scholarship good for the two-year Courses or for the first year of the Short Courses and first year of the four-year Courses, is granted to one student annually from each county in Ohio. If in any county there is no applicant for the free scholarship in the College of Agriculture, then a free scholarship, good for two years in the College of Veterinary Medicine, may be granted. Each scholarship is valid two years from its grantal and covers the incidental fee and all laboratory fees, but the person appointed to receive its benefits is subject to all the conditions prescribed for admission to the Course. The appointments are made by the County Boards of Agriculture, and are not transferable by the appointees. To learn whether the scholarship of a given county for the current year has been granted, inquiries should be addressed to the Secretary or President of the County Agricultural Society. For further information concerning these scholarships, inquiries should be addressed to the Dean of this College.

SELF-SUPPORT

There is a large amount of work on the University farm and campus and in the garden, orchard and greenhouses, which can be done by students, and for which they are paid at current rates for such labor. By this means, together with what can be earned by steady labor during the summer vacations, a considerable number of students defray all their expenses.

Preference is given to students who are willing to devote a certain number of hours each day to the work assigned.

Work cannot be promised to all applicants, and is not guaranteed to any.

Applications for employment should be made to Frank Ruhlen, Assistant in Agriculture. Labor blanks will be furnished upon request.

WHEAT FIELD ON THE OHIO STATE UNIVERSITY FARM

ENROLLMENT IN THE COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE, 1900-1901.

GRADUATE STUDENTS.

Gilmore, William H.	B. Sc. (Agr.)		Millersport
Hazen, Charles Ryerse	B. Sc.		Cleveland
			(Case School of Applied Science.)
Mooney, Charles Napoleon	B. Sc. (Agr.)		Milan
McCall, Arthur Gillett	B. Sc. (Agr.)		McGaw
McCallum, Raymond	B. Ph.		Dayton
Naret, William Frazier	B. Sc. (Agr.) M. A.		Morgantown, W. Va.
			(Morgantown University.)
Stewart, Charles Benjamin	B. Sc. (Agr.)		Marcy.
Van Norman, Hubert E.	B. Sc.		Lafayette, Ind.
			(Michigan Agricultural College.)

UNDERGRADUATE STUDENTS.

Abbott, George Franklin	Agr. S.	Second	Medina
Andrews, Harry Sherman	Dairy		Dean
Armstrong, Clara	Dom. Sci.	Fourth	Columbus
Armstrong, Gertrude	Dom. Sci.	First	Bannock
Arney, Samuel Hurd	Dairy		Lancaster
Arnold, Margaret Belle	Dom. Sci.	Special	Wellsville
Atherton, William Thomas	Agr.	Second	Carrollton
Bailey, Alva Caleb	Dairy		Tacoma
Baldwin, Ethel Florence	Dom. Sci.	Second	Columbus
Barcus, Eliza	Dom. Sci	Special	Columbus
Batterson, Annie Elizabeth	Dom. Sci.	First	Columbus
Bauman, Christian William	Dairy	Special	Axtel
Beale, Harry Glenn	Agr.	Third	Mt. Sterling
Beatty, Madge	Dom. Sci.	Second	Columbus
Belden, Herbert Lucius	Agr.	Third	Middlefield
Beneker, Robert Edgar	Agr.	Second	Cincinnati
Benjamin, Ray Calvin	Agr. S.	First	Pierpont
Bigger, Paul Breese	Dairy		Tiffin
Biggin, Orlo L.	Dairy		Vernon
Bowser, Earl Levi	Agr. S.	First	West Unity
Boynton, Frank J.	Agr. S.	First	Haverhill

Bratton, Alice May	Dom. Sci.	Fourth	Columbus.
Breckler, Leo Ambrose	Agr.	First	Defiance
Breeze, Clarence Nye	Agr.	Second	Lima
Bugby, Morris O	Agr.	Second	Kingsville
Cahill, Verrill W	Agr.	Second	Tiro
Campbell, Clara Naomi	Dom. Sci.	First	Columbus
Carril, Pedro Leon del	Agr.	First	San Juan, South America
Case, Claude Henry	Agr. S.	First	Hudson
Church, James Scott	Agr.	Second	Palmyra
Churchman, Moris Harper	Agr. S.	First	Jerome
Clapp, Ernest Talbot	Agr. S.	First	Chatham
Clark, Herman Alfred	H. & F.	Third	Medina
Clark, Ollie Dwight	Agr.	First	Wheat
Clawson, Lucy Blanche	Dom. Sci.	Second	Keana
Coberly, Edward D	Agr.	First	Georgesville
Codding, Harry Wylder	Dairy		Granger
Commons, Horace Joseph	Dairy		Centerville, Ind.
Conradi, Albert Frederick	Agr.	Fourth	New Bremen
Cotton, Edwin Charles	H. & F.	Third	Elyria
Crabb, James Byrl	Agr.	Second	Mt. Sterling
Crawford, Mary B	Dom. Sci.	Fourth	Blaine
Creamer, Jesse Carlton	Agr. S.	Second	Jeffersonville
Crumrine, George Ray	Agr. S.	First	Nova
Darling, Mabel Cordelia	Dom. Sci.	Special	Cardington
Davis, Ella Augusta	Dom. Sci.	Second	Galena
Davis, William Woolson	Dairy		Newark
Day, Albert Edward	Agr.	Third	Mt. Carmel
Derby, Florence	Dom. Sci.	Fourth	Columbus
Ditto, Theodore Walter	Agr.	Second	Delphos
Dixon, Eva Nicholson	Dom. Sci.	Third	Columbus
Dock, Norton	Agr. S.	Second	Cincinnati
Dresbach, Mary	Dom. Sci.	Fourth	Columbus
Dunlap, S. Arthur	Agr. S.	First	Williamsport
Dunlap, Frederick	H. & F.	Second	Chillicothe
Dunn, Hattie Franklin	Dom. Sci. S.	Second	Columbus
Duval, Harding Hays	Dairy		Wellsburg, W. Va.
Dwyer, Horace Earl	Agr. S.	Second	Greenfield
Eckman, Otto Leo	Agr. S.	First	Winchester
Ensminger, Harriet Margaret	Dom. S.	Special	Columbus
Erven, Orrin William	Agr. S.	Second	Grand Rapids
Faurer, Lorenzo Donaldson	Agr. S.	First	Ridgeville
Ferguson, Ollie	Agr.	Second	Steubenville
Fisher, Milo Eddison	Agr. S.	Second	Chili
Folsom, James Alfred	Agr. S.	First	Franklin Furnace
Foster, Chester Glenn	Agr.	First	London
Foster, John Cook, Jr	Agr.	First	Columbus
Foster, Emma Warwick	Dom. Sci.	Second	Higbys
Fox, Louis Henry	Dairy		Garland
Frame, Mabel Florence	Dom. Sci.	Special	Washington
Frank, John Nickolas	H. & F.	First	North Amherst
Frink, Clarence Benjamin	Dairy		Lupton, Colorado
Galehouse, David William	Agr.	Fourth	Doylestown
Gault, Thomas Chambers	Dairy		Fernwood
George, Harry John	Agr. S.	First	Beaver Falls, Pa.
Gerdeman, John Fred	Dairy		Ottawa
Gibson, Herbert R	Dairy	Special	Camp Chase

Grau, Maud Elizabeth	Dom. Sci.	First	Lucas
Guy, Earl William	Agr. S.	First	Mechanicsburg
Hamilton, Frank Edward	Agr.	Third	Brownsville
Hamilton, Harry Hoge	Agr. S.	First	Brownsville
Hanna, Charles Mitchell	Agr. S.	Second	Tiro
Hanna, Hortie Leroy	Dairy		Garretsville
Harper, Merritt	Agr.	Fourth	Grove City
Hatfield, Clifford Christian	Agr.	First	Lebanon
Hathaway, Ralph	Agr.	First	Scipio Siding
Hayden, Cassius Clay	Agr.	Fourth	Oakdale
Herrick, Hobert C.	Agr.	First	Wellington
Hess, Flora Louise	Dom. Sci.	Special	North Columbus
Hill, Mamie Faye	Dom. Sci.	Third	Columbus
Hill, George Baxter	Agr. S.	Second	Piqua
Hollister, Ruth Amanda	Dom. Sci.	First	Galion
Holloway, Carrie	Dom. Sci.	Second	Columbus
Holt, David C	Dairy	Special	Galloway
Hoover, Clarence Boal	Agr.	Second	Columbus
Hoover, Susan Corwin	Dom. Sci.	Special	Columbus
Hosmer, Victor	Agr. S.	First	Parkman
Hudson, James Frank	Dairy		Rootstown
Hunt, Claude Percival	Dairy		Bennetts Corners
Hynes, Clifton Edwin	Dairy		Nacissa, Pa.
Innis, Byron Schofield	Agr. S.	Second	Wagram
Irwin, Arthur Milton	Agr. S.	Second	Parkman
Jefferson, John Howard	Agr. S.	First	Madison Mills
Jennings, Otto Emery	Agr.	Third	Olena
Johnson, Homer Edward	Dairy		East Orwell
Jones, Lloyd	Agr.	Second	Columbus
King, Michael Albert	Dairy		Jackson Center
Klein, Edith May	Dom. Sci.	Special	Columbus
Ladrach, Lewis Frederick	Dairy	Special	Rogersville
Langdon, Elmer	Agr. S.	Second	Sabina
Lanman, Faith Robinson	Dom. Sci.	Second	Columbus
Linberg, Charles Guy	Dairy		Erie
Lindley, Lulu	Dom. Sci.	Special	Frederickt wn
Long, Frank C.	H. & F.	Second	West Sonora
Long, Jean Paul	Agr.	First	Columbus
Mallow, Harry Campbell	Agr. S.	Second	Washington C. H.
Mangold, E. Frank	Agr.	First	Sonora
Mark, Clara Gould	Dom Sci.	First	Milo
Marshall, Ida	Dom. Sci.	Third	Hemlock
Morton, Charles Owen	Dairy		Burton
Mears, William Holt	Agr. S.	Second	Moscow
Meek, Elizabeth Laing	Dom. Sci.	Special	Columbus
Mellen, Otis E	Dairy		Streetsboro
Meyers, Ada Lucy	Dom Sci.	First	Columbus
Miller, Edward	Dairy		Springerton
Miller, Morris B.	Dairy		Springboro
Minns, Edward Russell	Agr. S.	First	Lodi
McAlister, Lee Paden	Agr. S.	Second	Thornville
McClellan, John Arthur	Dairy	Special	Cable
McClelland, Chester Arthur	Agr.	Second	Terrace Park
McLaughlin, Grace	Dom. Sci.	First	Columbus
McMahon, Mary Gertrude	Dom. Sci.	Second	Columbus
McMillan, Fred D.	Dairy		Granger

Neill, Nelson Prentice	Agr.	Fourth	Venice
Nelson, Fred Walker	Agr. S.	Second	Salem Center
Neptune, Orrin Bird	Dairy		Loudonville
Newcomb, Howard Robinson	Dairy		Burton
Noice, Blaine G	Agr. S.	First	Ashville
Oliver, Robert Evin	Agr.	First	Chillicothe
Osborne, Harry Lester	Agr. S.	Second	Chardon
Paddack, Benjamin	Dairy		Hartwell
Patterson, Andrew Wylie	Dairy		New Concord
Perry, Elma Brooks	Dom Sci.	Fourth	Troy
Perry, John Cole	Agr.	Fourth	Columbia Station
Pessell, J. Bruce	Dairy		Fayette
Poindexter, Charles Cardoza	Agr.	Second	Parkersburg, W. Va.
Portman, Herbert Rudolph	Dairy		Birmingham
Postle, Stuart A	Dairy	Special	Camp Chase
Pratt, Jean Paul	Agr.	First	Huntington
Quiroga, Modesto	Agr.	First	San Luis, S. A.
Reyes, Julio	Agr.	First	Buenos Ayres, S. A.
Rogers, Truman	Agr. S.	First	Cardington
Ross, John Longbon	Dairy		North Eaton
Ruhl, George Pressley	Dairy		Fairview, Pa.
Ruhlen, La Motte	Agr.	Third	Plain City
Rutan, David William	Dairy		Mechanicsburg
Rutan, Hiram Edgar	Dairy		Mechanicsburg
Schwendeman, Frank Jacob	Dairy		Lowell
Senter, Pearl	Dom. Sci.	Special	Shepard
Sharp, Prentice D	Agr. S.	First	East Liberty
Shaw, Edward Lee	Agr.	Third	Newark
Sheldon, Helen Griswold	Dom. Sci.	Splecial	Shepard
Shellabarger, Ira Garfield	Agr. S.	First	Garland
Sherwood, Mary Gertrude	Dom. Sci.	First	Columbus
Shields, Jeannette	Dom. Sci.	Special	Denver, Col.
Sigrist, John Larkum	Agr.	Fourth	Congress
Siler, Leonard Edgar	Dairy		W. Manchester
Smith, Wilford B	Agr. S.	Second	Chesterhill
Snyder, Addison Hogan	Agr.	Fourth	Tacoma
Spohn, Louis Narcissus	Dairy		Easton
Stahl, Price Ewing	Agr S.	Second	Jewett
Steward, Alice Ione	Dom. Sci.	First	Columbus
Steward, Effie Edith	Dom. Sci.	First	Marcy
Sullivan, Fannie Augusta	Dom. Sci.	First	Rex
Tangemann, Clara Margaret	Dom. Sci.	First	New Bremen
Tarpning, Clifton Carmel	Dairy		Plain City
Thomas, Frank Leslie	Agr.	First	Chesterhill
Tobias, Deane Abram	Agr.	First	Bucyrus
Townsend, Melville West	Dairy		Motlinsville
Twitchell, Lee Downs	H. & F.	Second	Mansfield
Waite, Arthur Thompson	Dairy		North Ridgeville
Walker, Rolla E	Agr. S.	First	Attica
Wampler, Milton Eugene	Agr. S.	Second	Dayton
Washburn, Wayne	Agr. S.	First	Greenwich
Watkins, Salem Francis	Dairy		Granger
Weaver, Samuel James	Agr.	First	Leipsic
Weber, Sophia Francis	Dom. Sci.	First	Columbus
Welch, Fred Clair	Dairy		Ft. Wayne, Ind.
Wentz, John Earl	Agr. S.	Second	Bucyrus

West, James Clyde	Agr. S.	First	St. Paris
Wheeler, Thomas Leroy	Agr.	First	Chillicothe
White, Garret Brown	Agr.	First	Bucyrus
White, Jessie	Dom. Sci. S.	First	Columbus
White, Oscar Emil	Agr. S.	First	Payne
Whitehead, Albert	Agr.	Second	Pataskala
Williamson, Frances Glade	Dom. Sci. S.	Second	Columbus
Wilson, Sherman	Dairy		Clarksville
Wilson, Samuel Moore	Agr. S.	First	Bloomingburg
Wyman, Thomas Bright	H. & F.	First	Painesville
Yeazell, Frances Ward	Dom. Sci.	First	Berkeley, Cal.
Zehring, Edgar Levi	Agr.	First	Germantown
Zollinger, Jacob Christopher	Agr. S.	First	Thornville

SUMMARY

1900—1901

Graduate Students	8
Undergraduates	
Young Men:	
Four Year Courses	56
Two Year Courses	49
Course in Dairying	50
Young Women:	
Four Year Course	30
Two Year Course	17
Total	210

THESES OF THE CLASS OF 1901 OF COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE

ADVANCED DEGREES

MASTER OF SCIENCE

IN AGRICULTURE

William Henry Gilmore, B. Sc. (Agr.) ..... Basil
Thesis: Fluctuation in Prices of Farm Products in the United States.

FIRST DEGREES

BACHELOR OF SCIENCE

IN AGRICULTURE

Albert Frederick Conradi ..... New Bremen
Thesis: A Study of Cecidomyidæ and Their Effects on Vegetation.

Merritt Harper ..... Grove City
Thesis: The Draft of the Plow.

Nelson Prentice Neill ..... Venice
Thesis: A Study of the Agricultural Conditions of Ohio.

John Cole Perry ..... Columbia Station
Thesis: A Comparison of the Structure and Durability of Modern Self-Binders.

Freelan Wilbert Schaeffer ..... Columbus
Thesis: Pasteurization as a Means of Controlling Fermentation in Milk.

Addison Hogan Snyder ..... Tacoma
Thesis: The Conformation of Market Draft Horses.

BACHELOR OF SCIENCE

IN DOMESTIC SCIENCE

Clara Armstrong ..... Columbus
Thesis: History and Development of House Drainage.

Alice Bratton ..... Columbus
Thesis: The Number and Kind of Bacteria Found in the Ohio State University Spring Water.

Mary Crawford ..... Blaine
Thesis: Studies in Dietetic Menus for a Family of Five.

Florence Derby, B. Ph., 1896 ..... Columbus
Thesis: Bibliography of Foods.

Mary Dresbach ..... Columbus
Thesis: The Saprophytic Fungi Injurious to Foods.

Elma Brooks Perry ..... Piqua
Thesis: Bibliography of Domestic and Municipal Sanitation and Hygiene.

LIST OF ALUMNI AND OF THE EX-STUDENTS OF THE COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE SINCE 1892

Abbott, Arthur G., B. Sc. (Agr).....1899*.....Medina, O., Farmer
Abbott, Carl B.....(1898-1900)†.....Medina, O., Farmer
Adams, Walter Lewis.....(1897-1898).....Columbus, O., Adams' Express Company Employee.
Adams, Judson Jay.....(1896-1897)..... ....
Adcock, James G.....(1899-1900).....Webb Summit, O., Stock Farmer
Allen, Glen Lloyd.....(1898-1899).....Washington C. H., O., Farmer
Alpeter, John Edward.....(1896-1897).....Winfield, O., Farmer and Carpenter
Alvord, Lewis Upton.....(1896-1897).. ... .
Anderson, J. B.....(1897-1899).....Jewett, O., Teacher
Andress, Henry .....(1898-1899)..... Birmingham, Ohio
Armstrong, Edgar Manley.....(1899-1900).....Zanesville, O., Farmer
Arnold, Fank W.....(1899-1900)..Conneaut, O., Student Arts College, O. S. U.
Aten, Franklin Stewart.....(1895-1897).....Nevada, O., Stock Farmer
Auld, Jay Mc.....(1895-1896).....Iberia, O., Farmer
Aumend, Manuel Grant.....(1891-1894).....Delta, O., Farmer and Teacher
Ayers, Samuel Dana.....(1892-1895).....Orwell, O., Creamery Superintendent
Baer, Philip, Jr., B. Sc. (Agr.).....1897.....Canal Dover, O., Dairy Farmer
Baker, William Hollister. B. Agr.....1892.....Farmersville, Mo., Farmer
Baldwin, Linus R.....(1893-1896).....Youngstown, O., Machinist
Ball, F. C.....(1895-1896) .....Mt. Vernon, O., Farmer
Barker, Asbury Pletch.....(1895-1897)....Rural Route, New Lexington, O., Farmer
Baughman, Chas. Francis.....(1893-1894).....Springboro, O., Farmer
Bauman, Christian William.....(1899-1900)..Axtel, Ohio, Swiss Cheesemaker, Assistant Dairy School, O. S. U.
Beal, John William.....(1894-1895).....Dresden, O., Farmer
Beard, Ralph H.....(1895-1896).....‡Bucyrus, O., Farmer
Beard, Alexander Wilson.....(1897-1898).....‡New Buffalo, O., Creamery Operator
Beardsley, Ensign Newton.....(1895-1896).....Greenford, O., Farmer
Beattie, Emma Miles.....(1896-1897)..... ....
Beattie, Lena Leota.....(1896-1897)..Selma, Ala., Teacher and Missionary in Knox Academy.
Beattie, James Herbert.....(1898-1899).....Zanesville, O., Student Beaver Falls, Pa.
Beattie, Rosalie Mae.....(1898-1899).....Zanesville, O., Student New Concord, O.
Beattie, William Renick, B. Sc. (Hort.)...1894..M. Sc., 1897, Washington, D. C., Assistant in Horticulture, Division of Botany, U. S. Department of Agriculture.

* Indicates student completed four years' course in the year and with the degree mentioned.

† Indicates student was in college the year or years mentioned, but did not graduate.

‡ Not heard from since January, 1900.

Beem, Alda Morgan.....(1895-1896).....Jersey, O., Farmer
Beer, James Anderson.....(1895-1896).....Ashland, O., Law Student O. S. U.
Bell, Nelson Hugh.....(1891-1892)..... ....
Bently, William P., B. Agr.....1885..(B. A., 1890; M. A., 1893, Bethany College.) Missionary, 15 Miller Road, Shanghai, China.
Betts, Adelbert Hayes.....(1898-1899).....Kinsman, O., Cheesemaker
Birdsall, James Warner.....(1893-1896).....Green Spring, O., Farmer
Birney, Worthington H.....(1892-1893).....Tappan, O., Farmer
Blackley, Helen .....(1898-1899)..1361 Hunter St., Columbus, O., Student Columbus Kindergarten Training School.
Bloomfield, Lloyd M., B. Agr.....1891.....Paticea, Honduras, Cent. Amer., via New Orleans and Truxillo, Superintendent of Agriculture of the Colony of Valencia.
Boggs, Howard S.....(1898-1899).....Kingston, O., Farmer
Bogue Earnest E., B. Sc. (H. & F.).....1894..M. Sc., 1896, Stillwater, Okla., Professor of Botany and Entomology.
Bone, John Hayes, B. Sc.....1893..B. Sc. (Agr.), 1896, Shadeland, Ind., Farmer
Bowsher, Harry Dittmar.....(1896-1897).....Buckland, O., Stock Farmer
Bragg, Putman Benjamin.....(1897-1898).....Marietta, O., Dairy Herdman
Brandt, James McPherson.....(1893-1894)..510-511 Johnston Bldg., Cincinnati, O., Lawyer.
Brechbill, B. H.....(1895-1896).....Delanson, N. Y., Buttermaker
Breckenridge William Kemper.....(1898-1900).....Watertown, O., Farmer
Brinker, Thomas W.....(1897-1899).....Chatham, O., Farmer
Britton, John Carr, B. Sc. (Agr.).....1898..Mentor, O., State Horticultural Inspector, O. A. E. S.
Britton, William Miller.....(1897-1898)..126 W. Lane St., Columbus, O., Student Electrical Engineering Course, O. S. U.
Brown, Sumner J.....(1896-1897).....Bethel, O., Farmer
Brown, Alma Marie.....(1896-1897)..... ....
Brown, Aaron S.....(1892-1893).....Circleville, O., Farmer
Brown, Alfred P.....(1896-1897)..Dillon, Mont., Ranchman and Stock Raiser
Bryson, Julia Leona.....(1897-1898).....1292 Hunter St., Columbus, O.
Bundy, Lyman E.....(1898-1900)..Colerain, O., Fruit Growing and Gardening
Burkett, Charles William, B. Sc. (Agr.)...1895..M. Sc., 1898, Durham, N. H., Professor of Agriculture, New Hampshire State College.
Byers, William G.....(1898-1900).....Lilly Chapel, O., Farmer
Caldwell, Robert Smith.....(1894-1895)..... ....
Cameron, John H.....(1894-1895).....Damascus, O., Farmer
Candy, Ella Belle.....(1898-1900)..... Columbus, O.
Canfield, C. H., D. V. M., 1897.....(1893-1894)..Kansas City, Mo., Assistant Meat Inspector, Bureau of Animal Industry, U. S. Dept. of Agr.
Carey, Nathan Harold.....(1899-1900)..... ‡Guerneyville, O.
Carl, Harry W.....(1898-1899)..Columbus, O., Employee Standard Milk Co.
Cass, Roscoe Faskin.....(1896-1897).....Maumee, O., Dairyman
Clawson, Clarence A., B. Sc. (Agr.).....1899..D. V. M., 1900, 907 Penn St., Kansas City, Mo., Assistant Meat Inspector, Bureau of Animal Industry, U. S. Dept. of Agr.
Closson, Clayton D.....(1896-1897).....Cave Creek, Ariz., Chemist
Clevenger, Charles .....(1897-1899)..Fletcher, O., Student, Art College, O. S. U
Cline, Walter E.....(1893-1895).....New Vienna, O., Farmer
Coates, Elsie .....(1898-1899)..... Columbus, O.
Coddington, Alva Leroy.....(1894-1896).....Conover, O., Farmer
Coe, William D.....(1895-1896)..Washington C. H., O., Creamery Proprietor

Comstock, Allen L.....(1897-1899).....Harveysburg, O., Creamery Operator
Condit, Lorenzo S.....(1894-1895).....Sunbury, O., Dairy Farmer
Conkle, Harry .....(1895-1896).....Warsaw, O., Creameryman
Cotton, George Washington.....(1899-1900).....Elyria, O., Dairyman
Covell, Jay Innam.....(1896-1897)..... ....
Craig, Moses, B. Sc.....1889..M. Sc., 1890, Cornell; **M. Sc. (H. & F.),** 1896, O. S. U.; Orangeport, **Niagara County, N. Y.,** Teacher.
Cranz, Eugene Franz.....(1892-1893).....Ira, O., Farmer
Cromley, Alvah Miller.....(1892-1895).....Circleville, O., Prescription Clerk
Crowner, Delbert Alonzo, B. Sc. (Agr.)...1896.....Wellsville, N. Y., Instructor in Buttermaking, O. S. U.
Cunningham, John F., B. Sc. (H. & F.)..1897..M. Sc., 1899, Cleveland, O., Associate Editor Ohio Farmer.
Dallas, John Thomas.....(1893-1897, 1898-1900)..1231 N. High St., Columbus, O., Standard Milk Company.
Daniels, John Thomas.....(1892-1894).....East Liverpool, O.
Darling, Everett Clyde.....(1894-1896).....Nellie, O., Stock Farmer
Davenport, Chas. A.....(1892-1895)..Chillicothe, O., Employee B. & O. S. W. Railway.
Davis, Harriet Jane.....(1899-1900)..... ....
Davis, Vernon Hayes, B. Sc. (Agr.).....1900..Byesville, O., Post-Graduate Student Cornell University, Ithaca, N. Y.
Decker, Melville Clarence.....(1894-1895).....Findlay, O., Farmer
Demorest, Herbert Russell.....(1897-1900)..Grove City, O., **Rural Delivery No. 2,** Farmer.
Dennington, Wilbur Stanley.....(1898-1899).....Kerrnoor, Pa., Buttermaker
Devol, William Stowe, B. Agr.....1886..Redland, San Bernardino County, California, Newspaper Reporter.
Dille, Chas. Wallace.....(1896-1897).....Cleveland, O., Attorney at Law
Dodds, Austin Everett.....(1894-1895).....Tranquility, O., Stock Farmer
Dovel, Boyton .....(1898-1899)..75 E. State St., Columbus, O., Bookkeeper and Clerk.
Duncan, Donley .....(1896-1897).....Ludlow, O., Farmer
Dunham, Alonzo H.....(1894-1896)..Dayton, O., Assistant Physician **Dayton** State Hospital.
Dunlap, Renwick W., B. Sc. (Agr.).....1895.....Kingston, O., Farmer
Dunlap, John Hyde.....(1895-1896).....Williamsport, O., Farmer
Durbin, Theodore .....(1897-1898).....Danville, O., Cheesemaker
Durkee, Ray H.....(1896-1897).....North Eaton, O., Buttermaker
Dyar, Harry Spencer.....(1896-1897).....Marietta, O., Tool Dresser in Oil Fields
Egbert, Knott C., B. Agr.....1890..Ithaca, N. Y., Post-Graduate Student Cornell University.
Ensign, Ernest Harry.....(1898-1899).....Willoughby. O., Creameryman
Erf, Oscar, B. Sc. (Agr.).....1899..Champaign, Ill., Instructor in Dairying, University of Illinois.
Evans, R. W.....(1894-1895)..... ....
Evans, William B.....(1892-1894).....Newark, O., Lumberman
Everett, S. J.....(1898-1899).....Parkman, O., Cheesemaker
Everett, William Russell.....(1899-1900).....Gratiot, O., Creameryman
Ewart, John W.... .....(1899-1900).....Mogadore, O., Dairy Farmer
Falknor, E. A.....(1897-1898)..‡Troy, O., Yard Clerk, C., C., C. & St. L. R. R.
Farnsworth, Delmar J.....(1892-1893).....Waterville, O., Hardware Merchant
Fawcett, Arthur J.....(1893-1894)..405½ Exchange St., Akron, O., Agent Metropolitan Life Insurance Co. (Ind. Dept.)
Fearn, Nellie .....(1897-1898)..... ....

Fenner, Frank C.....(1891-1892).....Plymouth, O., Farmer
Finley, Aneta .....(1898-1900)..Keene, O., Student Oread Institute, Worcester, Mass.
Finley, Thomas K.....(1897-1899).....Keene, O., Farmer
Fippin, Elmer Otterbein, B. Sc. (Agr.)...1900..Washington, D. C., Division of Agrostology, Department of Agriculture.
Fischer, Julius H. R. Paul, B. Agr.....1891...D. V. M., 1892, Columbus, O., Professor of Pathological Anatomy, O. S. U.
Fischer, Walter, B. Sc., 1897.....(1894-1896)..Columbus, O., Fellow in Botany, O. S. U.
Fisher, Margaret Willmina.....1293 Hunter St., Columbus, O., Stenographer for S. H. Black & Co.
Fisher, Elmer E. .....(1897-1898).....Peru, Ind., Medical Student
Fitts, Rollin .....(1894-1898).....276 Orchard St., Marion, O.
Flickinger, George A., B. Sc. (Agr.).....1898..Knoxville, Tenn., Instructor in Dairying, University of Tennessee.
Florence, George .....(1891-1892).....Fox, O., Farmer
Flora, Charles Henry.....(1898-1900).....Arcanum, O., Student O. S. U.
Forsythe, John B.....(1895-1896).....Rushsylvania, O., Buttermaker
Foster, Fred May.....(1894-1896).....Died, Kingston, O., May 18, 1900
Foster, Michael Leander.....(1899-1900).....Florence, O., Cheesemaker
Fox, Charles Pinckney, B. Agr., 1890 (1897-1898)..1117 S. High St., Akron, O., Analytical and Synthetical Chemist, Diamond Rubber Co.
Fox, Charles .....(1897-1898).....Canal Dover, O., Florist and Gardener
Frazier, S H.....(1898-1899).....Nashport, O., Farmer
Garity, Benjamin Joseph.....(1896-1897).....Mt. Vernon, O., Creameryman
Garner, Clarence Harris.....(1897-1898)..... .....
Gearing, B. L.....(1897-1898).....Bessie Mine, Telluride, Colo., Miner
Geckler, Chas. F.....(1891-1894)....Beetstown, O., Salesman in Cleveland, O.
Gephart, George Washington.....(1894-1895).....Miamisburg, O., Farmer
Getz, F. L.....(1893-1894).....Grove City, O., Superintendent of Farm
Gibson, Herbert R.....(1896-1897, 1899)..Camp Chase, O., Assistant in Dairy School, O. S. U.
Gilmore, Walter Hayes.....(1896-1899).....Basil, O., Farmer
Gilmore, Wm. Henry, B. Sc. (Agr.).....1899.....Basil, O., Post-Graduate Student O. S. U., and Farmer.
Givens, David Albert.....(1895-1897)..Glen Flora, Chippewa Co., Wis., Lumberman and Farmer.
Givens, Warren Whittier.....(1897-1898).....DeKalb, Ill., Farmer
Givens, Warren Hayes.....(1897-1898)..... .....
Gladding, M .M.....(1897-1900).....Windsor, O., Farmer
Glathart, Harry Aaron.....(1891-1892)....Findlay, O., Civil Engineer and Surveyor
Glock, Edward Hoover.....(1896-1897)..... .....
Goddard, Harford Bishop.....(1896-1898).....Dunham, O., Farmer
Goodwin, Clare T.....(1896-1897).....Columbia Station, O., Dairy Farmer
Gove, Charles Frederick.....(1897-1898).....Tescott, Kansas, Creameryman
Graber, Christian .....(1899-1900).....Burton, O., Butter and Cheesemaker
Graham, John Edward.....(1893-1894).....Raccoon Island, O., Fruit-Grower and Farmer.
Grant, A. M.....(1892-1893)..... .....
Greenlee, Edward Hood.....(1896-1897).....Died, Bridgeport, O., 1898
Greenlee, James Ross.....(1898-1899).....Lansing, O., Farmer
Gregory, William Moody.....(1897-1898)..... .....
Griffith, W. I.....(1898-1899).....Galena, O., Farmer
Grimes, Charles Wilson.....(1897-1898)..... Springboro, O., Creamery Operator for French Bros. Dairy Co.
Grisier, Darcy B.....(1894-1895).....†Fayette, O., Groceryman
Haines, Edna Esther.....(1897-1898)..... Bloomingburg, O.

Hamilton, William Clarence.....(1892-1894).....Gratiot, O., Farmer
Harn, George Upton, Jr..... .....(1898-1899)..194 Wilson Ave., Columbus, O., Clerk for U. S. Weather Bureau.
Hard, Jesse M.....(1898-1900).....Elmwood, O., Farmer
Harris, Melvin J.....(1897-1898).....Garrettsville, O., Farmer
Harter, John Hoyt.....(1892-1894).....Box 149, Delaware, O., Farmer
Harry, Willis Grant.....(1896-1897)..Lancaster, Pa., Manager Lancaster Dairy Co.
Hawley, Wilbur .....(1896-1897).....470 Miller Ave., Columbus, O., Motorman
Heath, Harry Roger.....(1898-1899).....Big Horn Wyo., Creamery Operator
Heller, John .....(1899-1900).....‡Ona, W. Va.
Henderson, Frank A.....(1894-1897).....Died, McConnelsville, O., Sept. 27, 1898
Hershey, B. W.....(1897-1899).....Easton, O., Stock Farmer
Hill, Walter Centennial.....(1894-1895)..‡405 E. Town St., Columbus, O., Student Starling Medical College .
Hill, I. F. Reynolds, B. Sc. (H. & F.)....1896.....Toledo, O., Office Woolson Spice Company
Hiltner, Philip .....(1894-1895).....Landeck, O., Farmer
Hine, James Stewart, B. Sc. (H. & F.)....1893..Columbus, O., Assistant Professor in Entomology, O. S. U.
Hoff, Walter A.....(1894-1897)..... ....
Holderman, George Leland.....(1891-1892).....Kingston, O., Farmer
Holt, David C.....(1899-1900)..Galloway, O., Assistant in Creamery Laboratory, O. S. U.
Holmes, Ernest .....(1898-1899)..Wooster, O., Assistant in O. A. E. S.
Hood, Sherman, B. Sc. (H. & F.).....1894.....Meander, O., Market Gardener
Hoover, Louis C.....(1898-1899)..Naperville, Ill., Student, Union Biblical Institute.
Horst, David H.....(1897-1898).....Dalton, O., Farmer
Houston, Morris .....(1897-1898).....Mechanicsburg, O., Farmer
Hoyt, Corydon Albert.....(1891-1892).....Rock Creek, O., Farmer
Huff, Haines.....(1894-1896)..‡4310 Beech Hill Ave., Cincinnati, O., Mail Clerk on B. & O. S.
Hugenholtz, Paul .....(1897-1898).....‡Bussum, Netherlands, Bookkeeper
Hunt, Mary .....(1897-1898).....Died, Ridott, Ill., December. 1898
Hunt, J. Horatio.....(1899-1900)..... ‡Columbus, O.
Hunter, William, Jr.....(1892-1893).....Woodfield, O., Farmer
Hulburt, H. C.....(1896-1897)... ....
Hyatt, James Vernon.....(1899-1900).....Augusta, O., Teacher and Farmer
Imes, Marion, B. Sc. (Agr.).....1899..Durham, N. H., Assistant in Dairying and Veterinary Medicine, New Hampshire State College.
Immell, Woodford Elias.....(1898-1899).....Chillicothe, O., Farmer
Irvine, James .....(1898-1899).....Richmond, O., Farmer
Jackson, Walter Charles.....(1898-1899)..... .....Almeda, N. Y., Carpenter
James, Harold Francis.....(1899-1900).....19 Crystal Cove Ave., Winthrop, Mass.
Janton, Alexander .....(1896-1897)..... Columbus, O.
Johnson, Lisle M.....(1895-1896)..... Tiger, O., Farmer
Johnston, Frederick S., B. Sc. (Agr.).....1899..Durham, N. H., Assistant Professor of Agriculture, New Hampshire State College.
Jones, J. Lewis .....(1898-1899).....Penfield, O., Farmer
Jones, Hosea Henderson.....(1893-1894).....Radnor, O., Farmer
Joyce, Mary Gertrude.....(1897-1898).....78 Smith Place, Columbus, O.
Karnes, John Miller.....(1894-1895)..New Petersburg, O., Carpenter and Farmer
Kaylor, Rollie Washington.....(1899-1900).....Bellefontaine, O., Buttermaker
Kelley, Galeria May Belle.....(1898-1899)..... ....
Kelley, William L.....(1897-1900).....Newark, O., Dairyman and Farmer
Kellough, Jesse P.....(1894-1895).....Washington C. H., O., Stock Farmer

Kent, Mary .....(1898-1899)..... ....
Kerr, Franklin H.....(1892-1893, 1895-1896).....Monclova, O., Farmer
Kiddle, F. W.....(1895-1896).....W. Williamsfield, O., Farmer
King, J. C.....(1898-1899)..... ....
King, John Henry.....(1895-1896).....Raccoon Island, O., Farmer
Kinney, Chas. C.....(1899-1900).....‡Yellow Springs, O
Kirk, Edward Cassius.....(1898-1899).....Adario, O., Farmer
Kockers, Peter J.....(1893-1894)..... ....
Kohls, Frank Joseph.....(1892-1893).....Ottawa, O., Liquor Traffic
Kolbe, Lawrence Albert.....(1897-1899).....North Amherst, O., Teacher
Kuenzli, James Arthur.....(1893-1894).....Upper Sandusky, O., Farmer
Kynett, Albert Gardner.....(1899-1900).....Youngstown, O., Farm Employee
Ladrach, Lewis F.....(1898-1899).....Ragersville, O., Cheesemaker
Ladrach, John J.....(1899-1900)..Birmingham, O., Butter and Cheesemaker, Asst. in Dairy School, O. S. U.
Lakin, Arthur .....(1896-1897)..Station A, Columbus, O., Locomotive Fireman P., C., C. & St. L. R. R.
LaRue, Almon .....(1891-1892)..... ....
Laughlin, Joseph Gibson.....(1893-1894).....Catawba, O., Student O. W. U.
Lawrence, Mortimer William.....(1891-1894)..Cleveland, O., Vice-President of Lawrence Publishing Co.
Lee, Vernon W.....(1892-1893)..New Plymouth, O., Stock Breeder and Farmer.
Leonard, W. Elmer.....(1891-1895).....South Webster, O., Bookkeeper
Leyda, Manton Odell.....(1894-1895)..Pattersonville, O., Creameryman and Farmer
Liles, Frederick William.....(1897-1899).....Collins, O., Stock Farmer
Linsley, Frank P.....(1899-1900).....Gallipolis, O., Farmer
Long, Frederick Pontius.....(1897-1899).....Kingston, O., Farm Superintendent
Loomis, Humbert H.....(1891-1894, 1896-1899).....Deerfield, O., Farmer
Lutz, Ray ....(1893-1895).....Fremont, O., Farmer
Mackey, James Earle.....(1897-1898).....Richfield, O., Farmer
Manville, Herbert Emery.....(1896-1897).....Pharisburg, O., Farmer
Marion, Walter J.....(1897-1899).....Columbus, O., with Columbus Merchandise Co.
Martin, John R.....(1891-1892).....Windfall, O., Farmer
Mason, Arthur D.....(1897-1899).....Wellington, O., Farmer
Mayers, W. L.....(1898-1899)..... ....
Mays, James Wesley.....(1893-1894).....South Point, O.
McCall, Arthur Gillett, B. Sc. (Agr.).....1900.....Field Assistant, Bureau of Soils, U. S. Department of Agriculture, Washington, D. C.
McClellan, Arthur .....(1897-1899)..Cable, Cheesemaker, Asst. in Dairy School, O. S. U.
McClelland, Chalmer Kirk, B. Sc. (Agr.)..1898.....Andover, O., Farmer
McClure, W. W.....(1898-1899).....Union City, Ind., Stock Farmer
McCormick, Earl Leander.....(1896-1897)..Columbus, O., Salesman for Bancroft & Sheldon, Columbus, O.
McCullough, Clark W.....(1895-1897).....Steubenville, O., Farmer
McCullough, William Cleland.....(1892-1893).....Bucyrus, O., Lawyer
McDaniels, Fred Kimball.....(1896-1897)..13 San Juan de Letram, Mexico City, Mexico, Assistant Manager El Rosario Dairy Ranch.
McFarlane, Ellis .....(1897-1898)..New Bedford, Pa., Gardener and Horticulturist.
McHenry, J. B.....(1895-1896).....Vineyard Hill, O., Teacher
McKay, Weldon Kickerson.....(1897-1899).....New Burlington, O., Farmer
McKinley, Ira E.....(1899-1900).....Vaughnsville, O., Student

McLaughlin, Henry .....(1893-1894)..... ....
McLaughlin, Harrold .....(1898-1899).....Smith Place, Columbus, O.
McManis, A. T.....(1893-1894)..‡1341 Dorr St., Toledo, O., Salesman Market Gardener.
McNaughten, Stewart Alexander....(1895-1896).....Reynoldsville, O., Farmer
McOwen, James, Jr.....(1893-1894, 1896-1900)..... ....
McOwen, Thomas .....(1897-1899)....Ovid, O., Student Eng. College, O. S. U.
Meacham, Van Floran.....(1891-1892).....Atwater, O., Farmer
Meek, Eunice .....(1898-1900)..... Afton, O.
Meiche, Louis .....(1898-1900)..Cleveland, O., Student in College of Veterinary Medicine, O. S. U.
Mendenhall, Eugene Warren.....(1893-1896)....Eugene, O., Attorney at Law and Farmer
Mendenhall, John L.....(1894-1895).....Westland, O., Farmer
Mercer, Worley Deforest.....(1891-1892).....†Duncan's Falls, O., Physician
Mergler, Jacob C.....(1898-1899).....Marietta, O., Student Marietta College
Merwine, Edson A.....(1896-1897).....Woodview, O., Dairy Farmer
Mesloh, Harry Smith.....(1899-1900).....New Bremen, O., Farmer
Metcalf, Walter Charles.....(1898-1899).....Temple, O., Farmer
Millar, Michael Seymour.....(1895-1896)..... ....
Miller, Merritt Finley, B. Sc. (Agr.).....1900..Ridpath, O., Post-Graduate Student Cornell University, Ithaca, N. Y.
Miller, Maynard Everett.....(1899-1900)....Dodgeville, O., Creameryman and Farmer
Miller, Henry Alexander.....(1898-1899).....Gypsum, O., Fruit Grower
Miller, Carl James, B. Sc. (Agr.).....1898.....Franklin, O., Stock Farmer
Milliman, Prescott .....(1893-1895).....Milan, O., Stock Farmer
Mills, W. C., B. Sc. (H. & F.).....1898..Curator Archæological Collection, Ohio State University, Columbus.
Miner, Chas. A.....(1898-1900).....Bristolville, O., Farmer
Minnich, Otto William.....(1897-1898)..Zanesville, O., Marshall Route, Dairy Farmer.
Minnich, F. J.....(1897-1898).....North Amherst, O., Buttermaker
Montgomery, Frank .....(1898-1899)..... ....
Mooney, Charles Napoleon, B. Sc. (Agr.)..1900.....Columbus, O., Field Assistant, Bureau of Soils, U. S. Department of Agriculture, Washington, D. C.
Moorehead, Robert Henderson.....(1896-1897)..... ....
Morley, Ida Mae.....(1896-1897)..... ....
Morrow, John W.....(1893-1894).....Died, Bogart, O., October, 1898
Morrow, Clarence G.....(1895-1896).....Manila, P. I.
Mowry, Edward Philip.....(1896-1897).....Monroeville, O., Manager Star Creamery
Mull, Ernest Clinton.....(1898-1899)..Lebanon, O., Student Arts College, O. S. U.
Murphy, Farrah C.....(1894-1896).....Sunbury, O., Farmer
Murray, J. B.....(1898-1899).....Penfield, O., Butter and Cheesemaker
Murray, Edna Earl.....(1899-1900)..... Columbus, O.
Neale, Alvin S.....(1891-1892).....Rock, O., Dairy Farmer
Nelson, Fred Burgess.....(1899-1900)..Coe Ridge, O., Student Eng. College, O. S. U.
Nettleton, Albert Warren, B. Sc. (Agr.)..1898.....Medina, O., Farmer
Nettleton, Edward .....(1898-1899).....Medina, O., Farmer
Newton, Sheldon Watrous.....(1898-1899).....Boardman, O., Farmer
Nichelson, Charles .....(1892-1893).....Plattsburg, O., Farmer
Nidy, A. V.....(1896-1897).....Greentown, O., Farmer
Notman, Walter ....(1894-1895).....‡Deerfield, O., Cheesemaker and Farmer
Ohlemacher, John Jacob.....(1897-1898).....‡Prout's Station, O., Farmer
Oliver, Chas. Ray.....(1899-1900)..... ..... Pottersville, Pa.
Orton, Louise Taft.....(1899-1900).....Columbus, O., Mrs. F. C. Caldwell
Osborn, Alice .....(1898-1900)..Cadiz, O., Student Franklin College, New Athens, O.

Oswald, Rudolph ..... (1899-1900) ..... ‡Aurora, O
Owens, Walter Raleigh ..... (1897-1898) ..... Van Wert, O., Engineer
Palmer, Mary Ella ..... (1897-1898) ..... 2383 N. High St., Columbus, O.
Palmer, Jay ..... (1897-1899) ..... Penfield, O., Farmer
Parks, William C. ..... (1896-1897) ....
Parrett, Noyes Marvin ..... (1892-1893) ..... ‡Madison Mills, O., Farmer
Parson, John Strong ..... (1896-1898) ..... Rootstown, O., Farmer
Partridge, B. M. ..... (1897-1898) ..... Flint, O., Student Arts College, O. S. U.
Patterson, Mrs. George T. ..... (1897-1898) ....
Patterson, William Adolphus ..... (1894-1895) ..... Died, Kensington, O., July 12, 1898
Patton, Robert L. ..... (1894-1895) ....
Pemberton, Harvey Canmon ..... (1894-1895) ....
Pennybacker, Marion Stone ..... (1891-1892) .. Purcell, Indian Territory, Traveling Salesman.
Persing, Matthias James ..... (1894-1896) ..... Clyde, O., Truck and Fruit Grower
Peters, Francis ..... (1899-1900) ..... 27 N. Ohio Ave., Columbus, O.
Pfarr, Philip Lewis, B. Sc. (Agr.) ..... 1896 ....
Phillips, John C. ..... (1896-1898) ..... Bath, O., Cheesemaker
Phillips, John Howard ..... (1898-1899) ..... Died, Centerburg, O., November, 1898
Phillips, Josiah M. ..... (1891-1893) ..... Ayersville, O., Agency Work
Phinney, Chas. Amos ..... (1892-1893) ....
Pierce, Benjamin M. ..... (1897-1899) ....
Plumb, C. S. ..... (1895-1896) .. Lafayette, Ind., Professor of Agriculture, Purdue University.
Pollock, Charles Hamilton ..... (1897-1898) ..... Mill Village, Pa., Dairy Farmer
Postle, Stuart A. ..... (1896-1899) ... Camp Chase, O., Buttermaker Assistant in Dairy School, O. S. U.
Postle, Carlton David ..... (1898-1899) ..... Alton, O., Farmer
Postle, Florence ..... (1897-1899) ..... Camp Chase, O.
Powell, Earnest ..... (1891-1892) .... Rural Route No. 1, Van Wert, O., Farmer
Price, William R. ..... (1896-1897) ..... Died, Mineral Ridge, O., April, 1899
Price, Homer C., B. Sc. (Agr.) ..... 1897 ... M. Sc., Cornell, 1899, Ames, Iowa, Professor of Horticulture, Iowa State College.
Priest, Frederick, D. V. M., 1895 .. (1892-1893) ..... Newark, O., Veterinary Surgeon
Pugh, Stanley D. ..... (1891-1892) ....
Randolph, Frank Monroe ..... (1894-1896) .. Rural Route, New Lexington, O., Teacher and Farmer.
Rane, Frank William, B. Agr. ..... 1891 .. M. Sc., Cornell, 1892; Durham, N. H., Professor of Horticulture, New Hampshire State College.
Rarick, Murray M., B. Sc. (Agr.) ..... 1896 ..... Jacksontown, O., Physician
Ream, Earl S. ..... (1897-1898) .. Phoenix, Arizona, Dairyman at Arizona Experiment Station.
Reece, Chas. Elwood ..... (1894-1896) ..... Bucyrus, O., Stock Farmer
Reed, Oscar W. ..... (1894-1895) ..... Lebanon, O., Buttermaker
Reed, Jasper Robert ..... (1896-1897) ..... Blanchester, O., Dairyman
Reppert, Alda Cora ..... (1898-1899) ..... Columbus, O.
Reno, Mell Lewis ..... (1898-1899) .. ‡Hill P. O., Mercer County, Pa., Creamery Operator.
Rexroth, Royal A. ..... (1898-1899) ..... Bucyrus, O., Stock Farmer
Rice, Mabel Elise ..... (1898-1899) ..... 105 Hubbard Ave., Columbus, O.
Richards, Don Arthur ..... (1899-1900) ..... Medina, O., Buttermaker
Richardson, Hamilton H., B. Agr. ..... 1892 ..... South Brooklyn, O., Farmer
Ridinger, John G. ..... (1897-1899) ..... Died, Kalida, O., June, 1899
Ridings, Jesse Owen ..... (1893-1894) ..... Goshen, O., Teacher and Farmer
Riggs, Earnest J., B. Sc. (H. & F.) ..... 1895 ..... M. Sc., 1896, Raccoon Island, O., Farmer
Riley, Valeria ..... (1896-1900) ..... Washington C. H., O.
Roadarmer, Harry ..... (1897-1898) ....

Robb, Wyman Speer.....(1897-1898)..New Concord, O., Agent Keystone View Co.
Roberts, John L.....(1894-1895, 1897-1899).....Vaughnsville, O., Farm Manager
Rodegeb, Chas. A.....(1895-1896).....Roslyn, Ill., Dairyman
Rogers, John Wesley.....(1895-1896).....Bloomingburg, O., Carriagemaker
Rogers, Dwight Eugene.....(1895-1896)....Grafton, O., Engaged by Elyria Stone Co.
Rood, Venious Ardie.....(1893-1895).....Larue, O., Farmer
Roscoe, Frank B.....(1893-1895).....Greenwich, O., Farmer
Ross, Amos Loren.....(1897-1898)..Oneida, O., Co. H, 2d Infantry, U. S. Army, Manila, P. I.
Rubins, Frank .....(1896-1897).....Kenton, O., Dairyman
Ruhlen, Frank, B. Sc. (Agr.).....1896..Columbus, O., Assistant in Agriculture, Ohio State University.
Rutan, Maida .....(1894-1895).....Mechanicsburg, O., Mrs. M. Bullard
Rutan, Benjamin Milton.....(1893-1895).....Marysville, O., Creamery Operator
Sanders, Boston C.....(1897-1898)...Steubenville, O., Fruit Grower and Farmer
Saum, John Lincoln.....(1891-1892).....Antwerp, O., Farmer
Sayre, Eliza Morgan.....(1898-1899)....716 Neil Ave., Columbus, O., Musician, Mrs. Norris.
Schaadt, Martin .....(1894-1895).....Blue Mound, Kansas, Buttermaker
Schroeder, Glen Thomas.....(1895-1896)..... ....
Scott, Edith .....(1899-1900).....Mt. Pleasant, O.
Scott, Ernest, B. Sc. (Agr.).....1897..Columbus, O., Assistant Physician Columbus State Hospital.
Scott, Howard F.....(1896-1897).....Fair Haven, O., Farmer
Schaeffer, Freelan Wilbert.....(1896-1900)..1231 N. High St., Columbus, O., Standard Milk Co.
Scroggie, James Hugh.....(1894-1895)..Olmstead Falls, O., Supt. of Public Schools
Shaffer, Jesse .....(1899-1900).....Black Lick, O., Dairyman
Sharp, Edmond Maxwell.....(1896-1897).....1321 S. Main St., Akron, O., Bookkeeper
Shaw, F. C.....(1893-1894)..... ....
Shaw, James C.....(1893-1894).....Newark, O., Stock Breeder and Farmer
Shellabarger, Marley R., B. Sc. (Agr.)...1897.....Garland, O., Farmer
Shepard, Allen Day.....(1899-1900).....North Ridgeville, O., Creamery Operator
Shippee, Henry George.....(1898-1899)..... ....
Shriver, Sarah Luella.....(1896-1897)..... ....
Shumaker, Bertram .....(1896-1897)..LeRoy, O., Buttermaker for Cottage Creamery, Cleveland, O.
Skiles, Blanch Gertrude.....(1898-1900)..... Shelby, O.
Slater, Burr H.....(1892-1893).....Chesterville, O., Pharmacist
Smith, William David.....(1897-1898)..... ....
Smith, Elisha .....(1897-1898).....Beech City, O.
Smith, Leon D.....(1898-1899.....Silo, O., Foreman Smith Creamery Co.
Solether, C. F.....(1898-1899)..Jerry City, O., Assistant Cashier Cygnet Savings Bank.
Spencer, Silas McLaren.....(1897-1898).....Chrome Hill, Md., Manager Creamery
Spiers, Chas. E.....(1893-1895).....Atwater, O., Stock Breeder and Farmer
Steward, Chas. Benjamin, B. Sc. (Agr.)..1900..Marcy, O., Farmer and Post-Graduate Student, O. S. U.
Stiers, V. T.....(1899-1900)..... ....
Stimmel, John Russell, Jr.....(1896-1897).. .....Reeses, O., Farmer
Stoughton, Charles Peters.....(1897-1898)...Males Center, N. Y., Gardener and Farmer
Stump, Mrs. Franklin Pierce.....(1893-1894)..... Convoy, O.
Stump, Franklin Pierce, B. Sc. (Agr.)....1892.....Convoy, O., Farmer
Sweet, Smith E.....(1894-1896).....Mesopotamia, O., Farmer
Taylor, Fredric Wellington, B. Sc. (Agr.), 1900..Wooster, O., Assistant in Ohio Agricultural Experiment Station.
Taylor, Merrill S.....(1892-1894).....Urbana, O., Farmer
Taylor, Everett Burne.....(1897-1898).....New Albany, Student Law College, O. S. U.

Thomas, Elmer Ellsworth.....(1899-1900).....Newark, O., Farmer
Thompson, Jay .....(1896-1897)..Iloilo Panay, P. I., Clerk for Chief Surgeon, U. S. A.
Thompson, Benjamin Sells.....(1898-1899)..22 S. Main St., Mansfield, Hardware Salesman.
Thompson, Edith Leontine.....(1898-1899)..... Huron, O.
Thompson, Joseph J.....(1894-1895)..Cincinnati, O., Baldwin Piano Manufacturing Co.
Thompson, Frank McColgin.....(1896-1897).... ....
Thornburg, C. E.....(1897-1898)..Jonesboro, Ind., Gardener and Fruit Grower
Thorne, Bertram H.....(1891-1892)..Wooster, O., Vegetable Forcing and Florist
Titus, Clarence H.....(1894-1896).....Avon Beach, O., Farmer
Trowbridge, Warner Wesley.....(1898-1900).....Painesville, O., Farmer
Twitchell, Lee .....(1897-1898).....†Mansfield, O., Orchardist and Farmer
Tyler, Fred J., B. Sc. (H. & F.).....1900.....Assistant in Botany. O. S. U.
Uncapher, J. D.....(1897-1899).....Marion, O., Farmer
Uncapher, William H.....(1895-1897).....Marion, O., Farmer
Vandament, Orin .....(1898-1899).....Hamersville, O., Teacher and Farmer
Vermillion, Arthur H.....(1894-1895).....Martin's Ferry, O., Box 21, Shaft Sinker
Vickery, John B.....(1898-1899)..... ....
Vine, Oliver Jacob.....(1894-1895).....Lemoore, Cal., Creamery Operator
Waid, Clarence Wm., B. Sc. (H. & F.)...1898..Wooster, O., Assistant Horticulturist, O. A. E. S.
Wagner, W. Dow.....(1892-1893).....Kenton, O., Hardware Clerk
Walker, Wallace J.....(1892-1893)..Emerson, O., Died of Fever in Spanish-American War at Puerto Rico, 1899.
Ward, Harry Willliam.....(1898-1899)..... ....
Ward, Benjamin Nelson.....(1891-1892)..... ....
Ward, Philip Emerson.....(1893-1895)...Willoughby, O., Supt. of Kirkland Schools
Warden, Leonard C., B. Sc. (H. & F.)...1899..... Avon, O.
Weinman, George Henry.....(1891-1892)..... ....
Weisman, Laura Anna, B. Sc. (D. S.)....1900.....Durham, N. H., Mrs. C. W. Burkett
Wells, James Russell.....(1891-1892, 1894-1895).....Josiah, W. Va., Dairyman
West, Richard Sedgwick.....(1892-1893)..... ....
Westwater, W. G.....(1893-1895)..‡429 East Broad St., Columbus, O., Clerk Westwater's Queensware Store.
Whiley, Thomas Boyce.....(1896-1897).....Lancaster, O., Stock Farmer
Whipple, Charles Mantanion.....(1897-1898).....‡Columbia Station, O., Dairy Farmer
White, Maurice .....(1894-1895).....Rix's Mills, O., Farmer
Whitehead, Henry H.....(1895-1897)...General Delivery, Columbus, O., Dairyman
Whiting, Charles .....(1894-1896).....‡Omaha, Neb., Shoe Merchant
Whiting, Roy E.....(1897-1898).....Austinburg, O., Farmer
Whitman, Charles Henry.....(1898-1899)..... Doylestown, O.
Whitney, Charles Albert.....(1895-1896)..... ....
Wilkin, W. W.....(1897-1898).....New Lebanon, O., Farmer
Williams, Lee .....(1891-1892).....‡Pataskala, O., Druggist
Williams, Gilbert Carl.....(1893-1894)..... ....
Wilson, J. W.....(1895-1896).....‡New Concord, O., Buttermaker
Winkler, Herbert G.....(1894-1896).....Hanging Rock, O., Market Gardener
Winspeare, Joseph Agar.....(1893-1895).....Vickers, O., Dairy Farmer
Wise, Cyrus Newton.....(1891-1892)..... ....
Withoft, Clarence Warren.....(1893-1894)..Fort Valley, Ga., Manager Albaugh Georgia Diamond and Union Fruit Companies, and Ohio Fruit Land Co.
Ziegler, Juan .....(1892-1894)..... ....

University Bulletin Series 5 Number 10

OHIO STATE UNIVERSITY

CATALOGUE

OF THE

COLLEGE OF LAW

1901-1902

COLUMBUS
PUBLISHED BY THE UNIVERSITY

Entered at the Postoffice, Columbus, Ohio, as second-class matter

OHIO STATE UNIVERSITY

CATALOGUE

OF THE

COLLEGE OF LAW

1901-1902

COLUMBUS
PUBLISHED BY THE UNIVERSITY

THE OHIO STATE UNIVERSITY.

Under an act of Congress passed July 2, 1862, the State of Ohio received from the United States a large grant of the public lands for the purpose of establishing a "college where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such a manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." In accordance with this act, the Ohio State University was founded by the State as a public institution of learning. The governing body of the institution is a Board of Trustees, appointed by the Governor of the State for terms of seven years, as provided in the law organizing the University. The original endowment has been supplemented, and the objects of the University promoted, by a permanent annual grant from the United States, under an act of 1890; by special appropriations of the General Assembly; and in 1891, by a permanent annual grant from the State, which grant was doubled by the Legislature of 1896. Through the aid which has been received from the United States and from the State the University is enabled to offer its privileges, with a slight charge for incidental expenses, to all persons of either sex who are qualified for admission.

The University is divided into six colleges as follows:

The College of Agriculture and Domestic Science.
The College of Arts, Philosophy and Science.
The College of Engineering.
The College of Law.
The College of Pharmacy.
The College of Veterinary Medicine.

Each of the above named colleges is under the direction of its own Faculty, which has power to act in all matters pertaining to the work of the students of that particular college. The aim of the University is to give to the young men and women of Ohio the largest possible opportunity for both general and special training, in order to prepare them for the various duties of life.

The University is situated within the corporate limits of the city of Columbus, two miles north of the Union Depot and about three miles from the State Capitol. The University grounds consist of three hundred and thirty acres. The western portion, about two hundred acres, is devoted to agricultural and horticultural purposes, and is under the management of the College of Agriculture and Domestic Science. The eastern portion is occupied by the principal University buildings, eleven in number, the campus, athletic and drill grounds, a park-like meadow, and a few acres of primitive forest.

THE CONVOCATION.

At the opening of the year in September 1900, the daily chapel exercises were abandoned. As a substitute for the short daily exercise an entire hour is now devoted to a convocation at which the president presides. In addition to devotional exercises an address is delivered upon some suitable topic. During this hour the libraries and laboratories are closed and no other University exercises occur. It is expected that the Faculty and students will attend. The hour is definitely fixed at ten o'clock on Wednesday of each week. The public is always welcome at the Convocation.

FACULTY OF THE COLLEGE OF LAW.

REV. WILLIAM OXLEY THOMPSON, D. D.....University Grounds
President of the University.

W. F. HUNTER, Dean.....1032 Bryden Road; 18 Board of Trade
Professor of Law.

J. H. COLLINS.....57 Lexington Avenue; Ruggery
Professor of Law.

E. B. KINKEAD.....Wyandotte Avenue; 17 Board of Trade
Professor of Law.

G. W. KNIGHT, A. M., PH. D.....University Grounds
Professor of Law.

W. H. PAGE, B. A., LL. M.....1008 Franklin Avenue; 27 Board of Trade
Professor of Law.

D. F. PUGH.....1320 Highland Avenue; Board of Trade
Professor of Law.

E. O. RANDALL, PH. B., LL. M.....1025 Oak Street; Supreme Court Room
Professor of Law.

J. A. SHAUCK, M. A., LL. D.....95 Winner Avenue; Supreme Court Room
Professor of Law.

CALENDAR OF THE COLLEGE OF LAW.

1901—1902.

FIRST SEMESTER.

Entrance Examinations	Monday,	September 16.
Registration	Tuesday,	September 17.
Class work begins	Wednesday,	September 18.
Thanksgiving recess	Thursday,	November 28.
	Monday,	December 2.
Christmas vacation	Wednesday,	December 18, 1901.
	Thursday,	January 2, 1902.
First semester ends	Friday,	February 7, 1902.

SECOND SEMESTER.

Second semester begins	Monday,	February 10, 1902.
University day	Saturday,	February 22.
Spring recess	Friday,	April 4.
	Tuesday,	April 8.
Memorial Day	Friday,	May 30.
Final examinations begin	Monday,	June 9.
Entrance Examinations	Monday,	June 16.
Commencement	Wednesday,	June 18.

1902—1903.

FIRST SEMESTER.

Entrance Examinations	Monday,	September 22.
Registration	Tuesday,	September 23.
Class work begins	Wednesday,	September 24.

THE COLLEGE OF LAW.

REQUIREMENTS FOR ADMISSION.[1]

Requirements for admission of students who are candidates for a degree, beginning with the class graduating in 1904:—

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, or equivalents: Shakespeare's *Merchant of Venice*, *Julius Cæsar*, and *Macbeth;* Milton's *Lycidas*, *Comus*, *L'Allegro*, and *Il Penseroso;* Burke's *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison;* The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

*For requirements for admission to the second and third years of the law school see advanced standing p. 12.

1 An applicant for admission who may be somewhat in arrears in any given subject, will find opportunity to make up his work in the Columbus High Schools, which are fully accredited by the University.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of all of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Taylor's Academic or equivalent.

4. *Botany*—Kellerman's Elementary Botany and Spring Flora.

5. *Civil Government*—Fiske or Thorpe preferred.

6. *Geometry, Plain and Solid.*—Venable, Wentworth or Wells.

7. *History*—Either Myers' General History (or equivalent); or, if the teacher's training and the school library will warrant, Greek and Roman History on the topical method. A circular concerning the topical method will be sent on application.

8. *Physics*—Carhart and Chute, Gage, Avery, or Appleton.

9. Any two of the following groups:

(*a*) *Latin*—Pronunciation (the Roman method); Grammar (an exact knowledge of the inflections is essential); Cæsar, the first four books of the *De Bello Gallico*; Cicero, six orations, including *Pro Lege Manilia*; Virgil, the first six books of the *Aeneid*, with Prosody; Prose Composition, Daniell or Collar or Jones entire.

(*b*) *Greek*—Grammar (Goodwin's preferred) and Prose Composition; or the first 100 lessons of White's Beginner's Greek Book. Reading: The first four books of Xenophon's *Anabasis*. At least two years should be devoted to this work.

(*c*) *French*—The whole subject of French Grammar. Applicants will be expected to read at sight easy French; and to translate correctly into French, simple English sentences. Two years ought to be given to this study, the first year being spent mainly on the Grammar with easy reading; the second devoted to reading good modern French, with grammatical analysis and exercises in writing. The texts read should be chiefly narrative and conversational prose; one or more prose comedies of the nineteenth (*not* the seventeenth) century should be included.

(*d*) *German*—Joynes-Meissner's or Thomas' Grammar is recommended. The essentials in these grammars should have been mastered thoroughly, *i. e.*, declensions of nouns and adjectives, pronouns, comparison of adjectives, prepositions, regular and irregular verbs and essentials of syntax. The following books or their equivalents must have been read (not less than 600 pages). Joynes' or Whitney's Reader; Hillern's *Hoeher als die Kirche;* Riehl's *Der Fluch der Schoenheit;* Freytag's *Die Verlorne Handschrift, Gerstaecker Irrfahrten.*

(*e*) While the preferred requirement is that each candidate shall offer any two of the foregoing languages, he will be permitted to offer any two of the following subjects as the equivalent of one language:

1. *Chemistry*—Williams's or Remsen's.
2. *Physiology*—Martin's (briefer course).
3. *English Literature*—Pancoast's Introduction to English Literature and an acquaintance with representative works in each period.
4. *English History*—Montgomery.

10. In addition to the foregoing requirements for admission to the work of the College, *each candidate for a degree* must submit satisfactory evidence that he has successfully pursued a course of study equivalent to the first two years of any course leading to a degree in the College of Arts, Philosophy and Science, of this University.

The following statement of the work done in this University in the first two years of the College of Arts, Philosophy and Science of this University will serve as an illustration of the amount of work of college grade necessary for a degree. Equivalents for any subject will be accepted.

FIRST YEAR.

First Semester	Credit hours	Second Semester	Credit hours
Greek or German Xenophon.	4	Greek or German. Herodotus, Homer.	4
Latin or French Cicero.	4	Latin or French Livy, Horace.	4
Mathematics Algebra, Analytics, Calculus	3	Mathematics. Trigonometry, Analytics, Calculus.	3
Rhetoric Composition	2½	Rhetoric Composition.	2½

One of the following (the choice being for the year):

Botany	3	Botany	3
Botany Systematic and Physiological.	4	Zoology Comparative.	4
Chemistry Inorganic.	3	Chemistry Inorganic.	3
Physics Mechanics, Heat, etc.	3	Physics Electricity. Magnetism, etc.	3
Zoology Comparative Zoology.	3	Zoology Comparative Zoology.	3

SECOND YEAR.

First Semester	Credit hours	Second Semester	Credit hours
Greek or German Lysias.	4	Greek or German Homer, Plato.	4
History United States or Economics Elementary	4	Economics Elementary or History United States	4
Latin or French Horace, Pliny.	4	Latin or French Tacitus, Juvenal.	4
English Literature Introductory.	4	Rhetoric Analysis of Prose.	4

The candidate will be subject to examination in such work. Where this work has been done in a College or University of approved standing, the certificate of such college or university will be accepted as a substitute for such examination.

REQUIREMENTS FOR ADMISSION FOR STUDENTS NOT CANDIDATES FOR A DEGREE.

Beginning with the class that will finish in June, 1904, for students who are not candidates for a degree, the requirements for admission will be the same as the requirements for candidates for a degree except paragraph 10, page 11. No work of college grade is required of students who are not candidates for a degree.

ADVANCED STANDING.

The requirements both for admission as candidate for a degree and for admission not as candidate for a degree, have been raised to take effect first upon the class graduating in 1904. Admission to the First Year of the College of Law in the fall of 1901 will be under the new requirements already given.*

Admission to the Second and Third years will be under the pre-existing requirements. These are as follows:

For classes graduating in 1902 and 1903, requirements for admission not as candidates for a degree:

1. *To the First Year*—Applicants for admission to the First Year must present satisfactory evidence (by teacher's certificate—High School, Academy or College diploma—or by examination) of having a good common school education, including *United States History*, *Civil Government* and a thorough training in *English Composition*.

2. *The Second Year*—In addition to the requirements for admission to the First Year, applicants for admission to the Second Year must present satisfactory evidence of having completed the work of the First Year of the Course in Law or its equivalent.†

3. *To the Third Year*—In addition to the requirements for admission to the Second Year, applicants for admission to the Third Year must present satisfactory evidence of having completed the work of the First and Second Years of the Course in Law, or its equivalent.

REQUIREMENTS FOR ADMISSION AS CANDIDATE FOR A DEGREE—Students seeking a degree must, at the time of registration, present in addition to the requirements above mentioned satisfactory evidence of having completed a course of study, the minimum requirement of which is as follows:

Arithmetic, *Civil Government*, *Geography*, *Grammar*, *History of the United States*, *Physical Geography*, *Physiology*, *Rhetoric*, *Physics*, (Gage or an equivalent), *Geometry*, *Algebra*, (Wentworth's elements or an equivalent); and, in addition, the equivalent of 75 hours per week for one term of

* NOTE:—See Requirements for Admission, p. 9.

† NOTE:—See page 20.

12 weeks (a total of 900 hours) chosen from any five or more of the following subjects, one at least being a Science and two at least being in History or Political Science (unless the applicant is especially permitted to offer approved substitutes): *Botany*, *Chemistry*, *English Constitutional History*, *English History*, *English Literature*, *French*, *Geology*, *General History*, *German*, *Greek*, *Latin*, *Logic*, *Physics*, *Political Economy*, *Psychology*, *Surveying*, *Trigonometry*, *United States Constitutional History*; *provided*, that not less than 65 hours for twelve weeks (a total of 780 hours) of this work shall be of collegiate or university grade. Opportunity will be given for examination in any subject for admission as above indicated, or, if this last mentioned work has been done by the candidate in a College or University of good and approved standing, certificates of such institution will be accepted as a substitute for such examination.

SPECIAL STUDENTS.

Persons wishing a knowledge of legal principles *for business purposes only*, but not intending to apply for a degree or to take a full course, may be admitted at any time as special students, and may avail themselves of such advantages of the College as they may deem expedient, subject in each case to the approval by the faculty of the work proposed to be undertaken. Their convenience will not be taken into consideration in arranging classes, and they must make satisfactory arrangements as to fees, hours of recitation, etc., with the Dean.

ADMISSION TO GRADUATE WORK.

Graduates of this or other Colleges of Law may, on application to the Faculty, enter the College of Law and pursue such lines of work as may be arranged or approved by the appropriate committee. Such graduate students are subject to all the ordinary regulations prescribed for undergraduates.

Masters degrees are conferred upon graduates in Law at the end of not less than one year's residence, which shall be wholly devoted to the completion of an approved course of study in the College of Law. Each is required in addition to present an acceptable thesis upon some subject connected with his course of study.

TIME OF ENTRANCE, ETC.

In order to obtain the full benefit of the arrangement and detail of the course of study, a student should enter at the beginning of the First Year and attend regularly until the completion of the Third Year.

Those who are unable to do this are earnestly advised to enter promptly at the beginning of the college year, or if special work is desired in the second semester, at the beginning of such semester.

Those entering in the middle of a semester are greatly retarded both by the amount of work actually in arrears and also by the fact that the presentation of advance work must be given on the assumption that work already passed is properly understood by the student.

ENTRANCE EXAMINATIONS.

The University is open on equal terms to both sexes.

The entrance examinations for 1901 will be held on Monday and Tuesday, June 17 and 18, and on Monday, September 16. A part of the examinations may be taken in June and the remainder in September. Conditions incurred at the June examinations must be removed at the September examinations.

Applicants for admission to the College of Law must be at least eighteen years of age. Each must be provided with credentials of scholarship from his last instructor or from the last institution with which he has been connected, and with a certificate of good moral character.

There are three modes of admission to the University:

1. Certificates of the preparatory departments of Colleges of approved standing and of Normal Schools in Ohio, and of the State Board of School Examiners, are accepted, if found satisfactory, in lieu of examination for preparatory studies, under the following conditions:

Each certificate must contain a detailed statement of the studies pursued, the text books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination, and the applicant's rank or standing in it. A copy of the course of study should accompany the certificate; and both should be sent to the University not later than the first of September. *The University cannot promise this recognition to those certificates presented during entrance week.*

Blank certificates will be furnished on application.

Applicants for admission who come from other Colleges or Universities are required to bring certificates of honorable dismissal.

Teachers' certificates (in force) will be accepted at their face value.

2. Diplomas and certificates of approved High Schools will be accepted in lieu of examination for preparatory studies only under the following conditions:

(a) The certificate must state in detail the studies pursued, the textbooks used, the amount of work done in each study, the amount of time devoted to it, the date of the examination in it, and the rank or standing of the candidate in it.

(b) The certificate will be accepted for such studies only, or such part of each, as it shall show to have been satisfactorily accomplished.

(c) Every such certificate must be accompanied with a diploma showing that the candidate has completed the course of study in the school from which he comes. But the General Faculty may except from this condition schools whose work is known to be exceptionally good, provided the candidate has attended the school two full years.

3. No applicant for admission to the University will be accepted who is deficient or conditioned in required entrance work representing in the aggregate more than one daily recitation for a year. This rule does not apply to the college work indicated in paragraph 10, p. 11, as requisite for a degree. Work of collegiate grade may be made up at any time before the Friday preceding Commencement Day.

All other applicants are subject to examination on the groups of study mentioned above, under the heading of Requirements for Admission.

Full equivalents for the text-books named will be accepted.

APPLICATIONS FOR ADMISSION FOR DEGREES.

At the time of registration all applicants should present their diplomas and certificates of work done. These certificates should state in detail the studies pursued, the text-books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination, and the rank or standing of the candidate in it. A copy of the course of study must accompany the certificate in all cases. These statements should also be accompanied by information as to age, occupation, experience, and work done since leaving school. Blanks for application will be furnished on request made to the Dean.

THESIS.

Each candidate for a degree is required to prepare and deposit with the Faculty, not later than the second Saturday before Commencement of the year of graduation, a thesis of not less than fifteen hundred nor more than five thousand words, exclusive of citations of authorities, upon some subject selected by himself with the approval of the professor giving instruction in that division of law from which the subject is chosen.

The subject of every thesis, with the full name of its author or authors, together with the written approval of it by the head of the department within which it lies, must be filed with the president of the University, on the official blank provided for the purpose, not later than December 15 of the year in which the degree is sought.

All undergraduate theses shall be made on paper of uniform size, 8½-by 11 inches, and of quality and weight equal to that of a sample in the president's office. Theses shall be typewritten or printed, neatly bound in black cloth, and shall be gilt-lettered on the first cover with the thesis title, name of author, degree sought, and year of graduation.

Completed theses must be submitted to the head of the department concerned, not later than the second Saturday before Commencement Day.

A copy of the thesis so prepared and accepted must be filed with the University not later than the Friday preceding Commencement Day.

ADMISSION TO THE BAR.

The regular Supreme Court examination for admission to the Bar is held on the first Tuesday in June of each year. Students are required to pass this examination before they can receive the degree or certificate mentioned below.

DEGREES.

The degree of Bachelor of Laws (LL. B) will be conferred on all who, being at least twenty-one years of age and having met the requirements necessary for entrance for a degree, pass satisfactorily the examinations at the close of the Senior year, after having done at least that year's work in the College of Law at the University, and having presented a thesis acceptable to the Faculty.

The degree of Master of Laws will be conferred upon any one who has received the degree of Bachelor of Laws at this University, or other approved University or College, upon completing the studies of the Graduate year, and satisfactorily passing an examination therein, and presenting a satisfactory thesis, the subject of which has been chosen from the work included in the Graduate year.

CERTIFICATES OF WORK DONE.

Those who have completed the studies of this College, but have not complied with the requirements for a degree, will be given an official certificate, showing the work done, and signed by the President of the Board of Trustees, the President of the University, and the Dean of the College of Law.

No distinction is made between the candidates for the degree of LL. B. and other regular students while in attendance at this college. The two classes of students do the same work, recite together, take the same examinations, are held to the same standards of work and stand on the same footing for admission to the bar.

The distinction between the two classes of students consists entirely in the two following respects:

First—The standard of admission for candidates for a degree is higher than that for those who are not candidates for a degree.

Second—Candidates for degrees who have fulfilled all the entrance requirements and have completed the course of study in a satisfactory manner receive a diploma conferring the degree of LL. B. Regular students, who are not candidates for degrees, receive under similar circumstances a formal certificate of the completion of the course.

SUGGESTIONS FOR PREPARATORY READING.

In addition to the requirements for admission, it is earnestly recommended that every person who enters the College of Law shall first have a more thorough and careful preparation in English and American History than this College is now ready to require.

For such prospective students as are not able to study these subjects in a High School or Academy the following is suggested as an elementary course in History: Montgomery's English History, Fiske's or McMaster's or Johnson's United States History. In connection with these works, Civil Government, which is one of the required subjects, may be reviewed to great advantage.

Those who are able to pursue the subject further can derive profit from carefully looking up the various topics presented in the books above named, in any good encyclopædia. Bryce's American Commonwealth and Fiske's American Revolution and Critical Period of American History will prove of great value.

The remaining suggestions are made primarily to those who have been able to study English and American History to the degree already indicated, though in some cases the student may find it to his advantage to pursue these subjects farther, even without the full preparation above indicated. All those who have a good High School education, including American and English History, and are not able to obtain the advantages of a regular course in American and English History in a College or University are urged to continue their course of study before entering the law school by studying at least one of the following works upon English Constitutional History:

Walter Bagehot's English Constitution; Montague's Elements of English Constitutional History; Taswell-Langmead's English Constitutional History (Ashworth's Edition); Medley's Student's Manual of English Constitutional History (Second Edition); and one of the following works on English History: Green's Short History of the English People; S. R. Gardiner's Student's History of England; Oman's History of England; Goldwin Smith's United Kingdom; and at least one of the following books upon United States Constitutional History: Woodrow Wilson's Congressional Government; Judson Landon's Constitutional History and Government of the United States.

For those wishing to pursue the study of American Political History further recommendation is difficult on account of the wealth of material.

Channing's Student's History of the United States (new edition); Channing's United States of America; McLaughlin's History of the People of the United States; Goldwin Smith's Outline of the Political History of the United States are suggested.

Students are also strongly urged to read upon the subject of the Civil Law at least the forty-fourth chapter of Gibbon's Decline and Fall of the Roman Empire and Howe's Studies in the Civil Law.

Such students as have pursued the course here suggested as far as possible will find that the work done at the Law School, especially in the first year, will be proportionately more profitable to themselves.

UNIVERSITY COURSES SUITABLE FOR COLLATERAL STUDY

Nothing here said is intended to imply that this course of reading and study, helpful as it will be, is in any sense a substitute for a course in these subjects in a College or University. All who can should obtain the benefits of a college education before studying law.

For such as cannot, we suggest the advantage of attending a law school which is like this in close and vital connection with a great University. Strong courses in History, Political Science and Economics are offered at this University, which are open without extra charge to students in the College of Law, as they may elect, subject to the requirements for admission to such departments.

The following courses offered in the department of American History and Political Science will be found especially helpful to students in the College of Law:

History:—The general course in the political and constitutional history of the United States ; an advanced course covering the Revolution, framing of the Constitution, and the formation and organization of the Government; an advanced course, covering Secession, Civil War and Reconstruction, 1850 to 1876.

Political Science :—The political institutions of the United States ; the government of cities ; public international law.

In English Political and Constitutional History the following course is of especial value:

Political and Constitutional History of England from earliest times to the present. Lectures, text-books and assigned readings. Gardiner's *Student's History of England.* Three times a week for one year. Involves discussion of English legal history and institutions.

GENERAL UNIVERSITY COURSES.

Further attention is called to the great advantage of attending this College of Law, as its close and vital connection with the University affords the means of a liberal, practical and technical education. Students who are disposed to work faithfully and who desire to fit themselves for any special line of work may, at the same time that they are acquiring a technical knowledge of the law, supplement their general education by joining University classes, in departments which they may elect, subject to the

requirements for admission to such departments, without extra charge except for laboratory work. This work may be selected from the courses in Civil, Mine, Mechanical, and Electrical Engineering, from the courses in Anatomy and Physiology, Economic Geology, etc. To the average practitioner there will come ten questions involving the principles of surveying or engineering to one of the constitutional law or English history. Not a day passes in the litigation of the courts but that numerous questions of Anatomy, Physiology, Surveying or Engineering arise to be decided. Particular attention, therefore, is called to the technical courses offered by the University, which will be open to those in the College of Law who are able to take them without interfering with the required law work. The following departments offer courses which will prove beneficial to those who have not had such training as would enable them to take more technical work : Botany, Physiology, Physics, Civil Engineering, Mine Engineering, Chemistry (Toxicology), Geology, Philosophy, English.

METHOD OF INSTRUCTION IN LAW.

The instruction offered the undergraduates includes a course of study covering three years of nine months each. It requires at least fifteen hours of class work per week for each class, and embraces all the elementary and practical studies necessary for admission to the Bar.

The purpose of the college is to furnish such legal training as will fit students for practice in any part of the country; and to impart an accurate knowledge of the principles of the law and to illustrate the application of these principles to the practical affairs of life—to teach students both to know and to apply the law.

The methods of instruction pursued in this college combine the advantages of all approved systems, yet the *text-book and recitation* system is mainly employed. It is sought to direct the attention of the student to the acquisition of a thorough knowledge of the fundamental principles of law and to aid him in gaining a clear and distinct apprehension of the outlines of each particular subject taught, and, ultimately, of the science of the law as a whole. As is well said by Professor Bascom (Introduction to Philosophy of English Literature), there are, in each department of knowledge, central facts and germinal principles. If we reach these early and well, the labors of acquisition are greatly lightened. They serve to explain to the mind, and to hold for the memory, those multitudinous minor facts which otherwise confuse one and burden the other. The ground is thus outlined; we know where to look for particulars; and these, as they come to us by direct search, or as incidents of growing knowledge, fall at once into their place and strengthen our general hold of truth.

This object, it is thought, is best attained by the method of instruction distinctively known as the text-book and recitation system. In this method of instruction, the students in each class are required to provide themselves with the text-books prescribed; portions of the text are assigned

from day to day, for careful study as the basis of the recitation at the next meeting of the class, when each student's understanding of the principles involved is thoroughly tested by questions; misapprehensions and errors corrected before they become fixed in his mind; ambiguous and obscure statements in the text explained, discussed and illustrated; and such further assistance to a full and proper understanding of the subject afforded by the instructor as he may be able to render. The discussions and expositions are informal and are so conducted as to relieve the student from embarrassment, strengthen his grasp of the subject, quicken his perception and develop his reasoning powers. During these recitations the students are not only permitted, but are invited and encouraged to ask questions pertinent to the matter under consideration; which questions are then carefully and fully answered by the instructor or deferred for further consideration, investigation and research by the students and the instructor. Few formal lectures are delivered, but the instructor seeks to get as near the student as may be in his effort to gain a clear conception of the subject in hand; and, both by exposition of the text and familiar conversational discussions, to remove his doubts and perplexities. And further to assist the student in his efforts to master the principles of law, and to illustrate their application, in practice, to the affairs of life, he is referred to, and required carefully to study, leading and well-considered cases in the Reports of the American and English courts.

It will be observed that the students in the First Year class are engaged, during the First Semester, exclusively with Elementary Law, using Blackstone and two American works topically. The entire field of study is thus carefully outlined and the minds of the students thoroughly imbued with the general principles and prepared for the more elaborate expositions of the various subjects which follow in the course of study prescribed.

A recitation is one hour in length and the work in the College is so arranged that each class will have an average of at least three recitations each day.

COURSE IN LAW.

FIRST YEAR.

First Semester.	Recitation hours per week	Second Semester.	Recitation hours per week.
Elementary Law (including Domestic Relations)	15	Agency	2
		Contracts	4
		Criminal Law	3
		Sales	2
		Torts	4
	15		15

TEXT BOOKS.

First Semester—Elementary Law (Robinson, Walker, Tenth edition, and Blackstone).

Second Semester—Agency (Mechem); Contracts (Bishop); Criminal Law (Clark & Marshall); Sales (Tiedeman); Torts (Cooley).

SECOND YEAR.

FIRST SEMESTER.	Recitation hours per week
Bailments	3
Commercial Law	5
Evidence	2
Pleading	4
Moot Court	1
	15

SECOND SEMESTER.	Recitation hours per week
Construction of Contracts	2
Evidence	2
Partnership	2
Pleading	2
Real Property	4
Wills	2
Moot Court	1
	15

TEXT BOOKS.

First Semester—Bailments (Hale); Commercial Law (Tiedeman); Evidence (Greenleaf, Sixteenth edition); Pleading (Phillips and Kinkead's Selections).

Second Semester—Construction of Contracts (Jones); Partnerships (Parsons); Real Property (Tiedeman); Wills (Page).

THIRD YEAR.

FIRST SEMESTER.	
Circuit and Supreme Court Practice	1
Constitutional Law } International Law }	4
Corporations (Private)	2
Corporations (Municipal)	2
Equity Jurisprudence	4
Probate Law	2
Moot Court	1
	16

SECOND SEMESTER.	
Corporations (Private)	2
Corporations (Municipal), Negligence of	3
Ethics	2
Federal Practice	2
Mortgages } Suretyship }	2
Trial Practice	2
Moot Court	1
	14

Thesis for graduation to count for two hours through second semester.

TEXT BOOKS.

First Semester—Constitutional Law (Black); Private Corporations (Taylor); Municipal Corporations (Tiedeman); Equity Jurisprudence (Merwin); Probate Law (Whittaker's Probate Code).

Second Semester—Ethics (Sharswood); Negligence of Municipal Corporations (Jones); Suretyship (Baylies); Trial Practice (Kinkead).

ADVANTAGES.

LOCATION.

Attention is called to Columbus as a place in which to study law. Here the Legislature meets; here are the Supreme Court, Circuit Court and four branches of the Common Pleas Court, in almost daily session throughout the college year; the Probate Court, the County Commissioners, the City Court and the several Magistrates' Courts; also the U. S. Court and District Courts. All are easy of access from the College.

LIBRARIES.

The following libraries are accessible to the student:

The Law Library of the College contains the Noble Law Library, the Emerson–McMillin Law Library, the Critchfield Law Library, four sets of the Ohio and the Ohio State Reports, and many other leading reports; in all, about 3,000 well selected volumes.

The University Library contains 40,000 volumes of very carefully selected books upon all subjects. This is quite complete in the more recent standard works upon history and political science, philosophy, etc. A good collection of the leading scientific, technical and literary magazines and journals is to be found here.

The State Law Library, of about 35,000 volumes, is the largest and most complete Law Library in the State. It contains complete sets of the English, Scotch, Irish, Canadian, United States, and State Reports, Statutes and Digests, as well as all the important text-books and leading periodicals published. This library is located in the new State Supreme Court building.

The State Library, in the State House, is a library of general literature, history, science, biography, political and social science, philosophy, etc., comprising some 65,000 volumes. The leading magazines, journals, etc., are also to be found here.

The University Libraries are open from 7:30 A. M. to 9:30 P. M. during the five days in which the University is in session, and on Saturdays from 8 A. M. to 4 P. M. The State Law Library is open six days in the week, from about 8:30 A. M. to 5:30 P. M., with the exception of about an hour or an hour and a half at noon. The State Library is open six days in the week from 9 A. M. to 12 M., and from 2 P. M. to 5 P. M.; and when the Legislature is in session, from 7 P. M. to 9 P. M.

The City Library, with 30,000 volumes and a fine reading room, may also be used by students, under reasonable restrictions.

EXPENSES.

Each undergraduate student of the University is required to pay an incidental fee of fifteen dollars a year, and in this College a tuition fee of forty-five dollars; a total of thirty dollars for each semester, which is payable at the beginning of each semester.

Graduate students are required to pay a fee of thirty dollars for the year.

A fee of five dollars (to cover the expenses of graduation, diplomas, etc.,) is charged to all who take the degree of Bachelor of Laws, and a fee of ten dollars is charged to those taking the degree of Master of Laws. These fees must be paid before the degrees are conferred.

Good boarding and lodging, convenient to the University, can be obtained at from $3.50 to $5.00 per week.

The text-books used in this College can be obtained at the University at students' prices. The University has no interest in these books or the sale of them, and they are permitted to be sold there merely for the convenience of the students.

The books for the first year	$	43 50
For the second year		40 00
For the third year		36 00
Total for three years	$	119 50

Please to send names and addresses of law students, and requests for printed matter to W. F. Hunter, Dean, 1032 Bryden Road, Columbus, Ohio, or to the Executive Office, Ohio State University, Columbus, Ohio.

SELF-SUPPORT.

There is a large amount of work upon the University farm which is assigned to students, preference being given to those who are studying Agriculture. *But the University cannot promise work to all applicants.* Many students find work in private families, in offices, and in various occupations, by means of which they defray at least a portion of their expenses. A person of ability and energy, who is master of a trade, or who can do good work of any kind, can generally find remunerative employment. It has seldom been known that any student of ordinary energy and industry was obliged to leave the University because of a lack of money for necessary expenses, *after having been sixty days on the ground*—or long enough to inform himself as to the opportunities for securing employment.

Students should distinctly understand that where they attempt entire or partial self support they should lengthen the term of study. An employment bureau is maintained at the University where the names of those seeking work and of those desiring workers are recorded. Students should report to the Executive Office from time to time as to their needs and their work. This will enable the authorities to be more helpful than otherwise would be possible.

PRIZES.

The Edward Thompson Company offers annually to the student writing the best essay on a legal subject selected by the Faculty of the College of Law, the second edition of the American and EnglishEncyclopædia of Law, which consists of about thirty volumes; and Professor Kinkead offers, as a second prize, his work on Pleading.

NEW LAW BUILDING.

The Legislature, at its last session, made an appropriation for the erection of a building for the use of the College of Law. The work is in progress and it is expected that the building will be ready for occupancy during this year.

LAW LITERARY SOCIETY.

The William F. Hunter Society, composed of students in the College of Law, meets every two weeks for quiz-work, moot-court practice, and practice in speaking and debating.

STUDENTS—1900–1901.

	Year.	Home Address.
Abt, Oscar M.	First	Canton
Adams, Judson J.	First	Dresden
Aldrich, Wesley Richard.	First	Columbus
Alspach, Rufus Edwin	First	Columbus
A. B., Heidelberg; A. M., O. S. U.		
Alvord, Justus Elvin.	Third	Bryan
Ammon, Harry Delbert.	First	Potsdam
Amos, Frank Craig.	Third	Sidney
Armstrong, Daniel Hinkle.	First	Jackson
Bamer, Merton Leonard.	Third	Grand Rapids
Barnes, Barzillai Owen.	First	Rushville
Ph. B. Otterbein.		
Barrere, Granville.	Second	Hillsboro
Beatty, Robert Jay.	Third	Cardington
Bechtol, John M.	Second	Fayette
Berry, Edmond Franklin.	Third	Celina
Blake, John T.	Third	Canton
Bock, Theodore E.	Third	Hamilton
Bostwick, Homer Z.	Second	Columbus
Bowers, Walton S.	Third	Hamilton
Bowles, John Porter.	First	Columbus
Brandt, James Herbert. B. A.	Second	Greencastle
Brandt, Ulysses Sherman. B. A.	Second	Columbus
Brewer, Claude Leon.	Third	Columbus
Brown, James Earl.	Third	De Graff
Brumbaugh, Roscoe Philip	Third	Horatio
Buhrer, Albert M.	Second	Archbold
Burr, Karl Edward. A. B. Princeton.	First	Columbus
Campbell, William Goble.	First	Preston
Carey, John T.	Third	Upper Sandusky
Carlin, Rawson King	Third	Findlay
Cash, Homer M.	First	Lore City
Clark, Lawrence Hayes.	Second	Cumberland
Clark, William Whittier.	Second	Canton

	Year.	Home Address.
Clum, Harry Ernest	Third	Thornville
Conrad, Edward Nelson	Third	Tiffin
Core, Harry S	Third	Columbus Grove
Costello, Edward Wilfred	Third	Defiance
Crawford, Ruel Hamlin	First	Port Clinton
Crout, Ray Durand	Second	Columbus
Cunningham, Charles Gilman	First	Fostoria
Curran, Bernard Franklin	Third	Corning
Davis, David Hiram Star	Second	Findlay
Davidson, Harold Glenn	First	Dayton
Dawson, Nathan Charles	Third	Columbus
De Golly, Lloyd Parsons	First	Galion
Dieterich, Henry Claude	First	Piketon
Dodds, Frank Wylie	Second	Xenia
Doorley, Hugh	Second	Sidney
Doud, Harry L	Third	Norwalk
Downing, Earl Summerville	Third	Middleport
Du Bois, David D	First	Bellaire
Dunlap, Carl Reed	Third	Columbus
Durand, Charles Homer	First	Toledo
Durbin, Samuel Clyde	First	McConnelsville
Duval, Marshall Ney	First	Steubenville
Eagleson, Joseph Pentecost. Ph. B.	First	Columbus
Emory, Charles Merton	First	Flatt
Euans, William Weldon	First	Columbus
Evans, Thomas Daniel	Second	Newark
Evans, Lyle Sanford. A. B. Miami U.	Third	Chillicothe
Farnham, Harry Rathburn	Third	Edgerton
*Foster, George Gruel	Second	Columbus
Frankenberg, Don Juan	Third	Tempe, Arizona
Frazier, Robert Lewis	First	Gnadenhutten
Fullerton, Charles Hayward. Ph. B.	First	Wheelersburg
Galloway, Arthur Clyde	Third	Columbus
Glick, Frank Morris. B. Sc. Ada Normal.	Second	Amanda
Godown, Harry Clayton	First	Hilliards
Goode, Thomas Allen	First	Columbus
Grabiel, John Wellington	Third	Bowling Green
Gurney, Rexford R	First	Mansfield
Haberer, Harry Andrew	Third	Dayton
Hales, Burton Elon	First	Henrietta
Hammond, Frank Nathan	Third	Smithfield
Hammond, Frederic Mathas	Third	Smithfield

*Died, October 12th, 1900.

	Year.	Home Address.
Hauss, Eugene Augustus	Second	Wapakoneta
Hempstead, David King	First	Wilmington
Hinkle, Lester E	First	De Graff
Hite, William A	Second	Thornville
Houle, Frank Gaydon	Second	Bellevue
A. M. Western Reserve.		
Huggins, Burch Delaplaine. B. Ph.	Second	Hillsboro
Hummell, Edwin Ray	Second	Carroll
Humphrey, Oliver Perry	First	Glenmont
Hunt, Joy H	First	Columbus
Johnson, Charles Foster	Second	New Albany
Johnston, Robert Royal	First	Marietta
Jones, Alonzo N	Third	New Martinsburg
Jones, David Thomas	Second	Youngstown
Jones, Hanby Raymond	Third	Westerville
Kahle, James Byron	Second	Tedrow
B. Ph. Hiram College.		
Keating, David Thatcher. B. Ph.	Second	Columbus
Kellough, Robert Wallace	Second	Range
Kelly, J. Reid	First	Lakeside
Kennard, Oron Ellsworth	Second	Chester Hill
Kinzel, Harry Gilbert	Third	Eagleport
Kramer, John Franklin	Second	Butler
A. B. Ada Normal.		
Kremer, Theodore John	Second	Miltonsburg
Ladd, Jonathan E	Third	Bradner
Lambert, Elza J	First	Plantsville
Lash, Henry Lloyd	Third	Bolivar
Laybourne, Lawrence E	Second	Springfield
Leach, Arthur Othello	First	Peerless
Leas, Charles Russell	First	West Sonora
A. B. Ada Normal.		
Leeper, Charles Foster	First	Marietta
Leet, Louis John. B. L. Hiram College.	Second	Freedom
Leonard, Ralph Sherman	Second	Granville
A. B., A. M. Denison University.		
Lerch, Ira William	Third	Canal Fulton
Lindsay, George Wilbur	First	Commercial Point
Lloyd, Erastus Guy	Third	Westerville
Luckhart, Cyrus Floyd	Second	Columbus
Luse, James Herbert	First	Sandusky
Lynch, John Woods	Third	Greenville
Madden, Ernest C	First	Columbus
Mallow, Lewis Earl	Third	Washington, C. H.

	Year.	Home Address.
Mattison, George C.	Third	Wauseon
Maxwell, Earl Frederick	First	Xenia
Miller, James Wilford	Third	Bucyrus
Milligan, Charles Clinton	Second	Gnadenhutten
Minshall, Thaddeus Ellis	Third	Chillicothe
Moloney, William Patrick	First	Codding
Moore, Henry Curtis	Third	Bainbridge
Moore, Lyman Gooderl	First	Quaker City
B. Sc. Ada Normal.		
Murphy, Frank Hayes	Third	New Comerstown
McAllister, Earl Saddler	First	Columbus
McCormick, Earl Dudley	First	Logan
McCulloch, Roscoe Conkling	Second	Millersburg
McGarry, James Frances	Second	East Liverpool
McGinnis, Cliff Earl	Second	Sidney
McSweeney, Fred Milton	Second	Sidney
McQuigg, Charles W	First	Pomeroy
Nary, Owen Benjamin	Third	St. Clairsville
Nash, Simeon	First	Zanesville
Needles, Harvey Harold	Second	Sidney
Nevin, Lurton K.	First	Dayton
Nicholas, Edward Mithoff	Second	Columbus
Notestine, Emmett Vance	First	De Graff
Page, Walter, Jr. B. A. Yale	First	Columbus
Parsons, George M.	First	Columbus
Pence, William D.	Third	Tiffin
Pontius, Hubert C.	Second	Canton
Porter, Albert Abner	Third	McConnelsville
Price, John H.	First	Youngtown
Price, Jonathan. A. B. Sc. Ada Normal.	Third	Chili
Ragan, Eleanor Virginia	First	Napoleon
Reed, Bert	Third	Piqua
Reeves, Claude John	Third	Columbus
Riddle, Abner E.	First	Columbus
Ridenour, Walter Ashton	First	Jackson
Riegle, Franklin P.	Third	Hoytsville
Rightmire, George Washington	Third	Columbus
Rittenhouse, William Oscar	Second	Holgate
Robinson, Charles Grier	Third	Rockaway
Roche, George Emmett	Third	
Rockhill, John D.	Third	Alliance
Roebuck, Carl Fletcher	Second	Dalton
Royon, Joseph Charles	Second	Houston
Sackett, Carl Leroy	Third	Big Horn City Wyo.

	Year.	Home Address.
Sager, Ward Cleland, B. A. Hiram Col.	Second	Bryan
Sayre, Charles Boyd, B.A.	First	Columbus
Schantz, Edwin Michael	Second	Zimmerman
Schoedinger, Frederick H.	Second	Columbus
Seney, George Ebbert, Jr.	Third	Toledo
Shaw, John William	Third	Troy
Sheetenhelm, Curtis Cicero	Second	Columbus
Sheetz, George William	Second	New Washington
Shotwell, Franklin Albert	Second	Marengo
Sigrist, Charles Ferdinand	First	Congress
Singleton, Charles Tod, B. Ph.	First	Columbus
Skiles, Roscoe Carleton	Third	Shelby
Smith, Philotas M.	First	Egypt
Smith, Stanley Robb	First	Columbus
Smith, Wellington Cornell.	Third	Lytle
Snepp, Hugh Allen, A. B. Heidelberg	Third	Miamisburg
Snow, Mason J.	Second	Columbus
Snyder, Fred Orton	First	Castalia
Sparks, Homer H.	Second	Columbus
Sprague, William Ralph	Third	Columbus
Spurrier, Emery Allen	Second	Chesterhill
Stahl, Charles Henry	Second	Winesburg
A. B. Ada Normal.		
Starkey, Neil. B. Sc. Ada Normal	First	Zanesville
Stehle, Frank Reinhard	First	Marietta
Steinemann, George Charles	Second	Minster
Stewart, George Francis	First	Coshocton
Stewart, Gilbert Holland, Jr.	First	Columbus
Sullivan, Oscar M.	First	Columbus
Swan, Frederick	First	Marietta
Tangemann, Theodore H.	Second	Kettlerville
Taylor, Everett Buren	Second	New Albany
Taylor, Frank Stewart	Second	Alliance
Terwilliger, Meeker	Third	Circleville
Thomas, Frank S.	First	Harlem Springs
Thompson, King Gibson.	First	Georgetown
Thompson, Ernest, B. Sc. Ohio Normal	Second	Bellefontaine
Tompkins, Haldan Urling	First	Chicago
Turner, Edward C.	Third	Columbus
Vandersall, Chester E.	Third	Burgoon
B. Sc., L. L. B. Ohio Normal.		
Veneman, Nevin Edward.	Second	Dayton
Wagner, Oscar Cecil	First	Kingston
Wakefield, George W.	Third	Harrisburg

	Year.	Home Address.
Walker, Mary Ray	First	Dayton
Walsh, George E.	First	Columbus
Warner, Charles William	First	Akron
West, Frederick Rollin	Third	Columbus
Westwater, James Gulick	Second	Columbus
Wharton, Homer Franklin	Third	Washington
Wheeler, Newberry William, Jr.	Third	Portland
Whitaker, William Earl	First	Colton
White, Charles E.	First	Canandaigua, N. Y.
Whitmore, William G., A. B. Wooster	Third	Crestline
Williams, Cortez L.	Third	Steubenville
Williamson, Allen Thurman	Third	Grandview
Wilson, Charles R.	First	Circleville
Wise, Charles Clifton Ph. B. Hiram College.	Second	Millersburg
Wonders, Adelbert E.	Third	Warren
Worcester, Wood Frank	Third	Columbus
Worman, Horace Dye	Third	Dayton
Wulff, August R.	Third	Dayton
Yost, William Frank	Second	Minerva

University Bulletin Series 5 Number 11

OHIO STATE UNIVERSITY

CATALOGUE

OF THE

COLLEGE

OF

ARTS, PHILOSOPHY and SCIENCE.

1901-1902

COLUMBUS
PUBLISHED BY THE UNIVERSITY

Entered at the Postoffice, Columbus, Ohio, as second-class matter

OHIO STATE UNIVERSITY

CATALOGUE

OF THE

COLLEGE

OF

Arts, Philosophy and Science

1901-1902

COLUMBUS
PUBLISHED BY THE UNIVERSITY

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DAYS AND DATES

1901

Summer Session of Lake Laboratory at Sandusky, July 1 to August 23
Entrance Examinations.....Monday and Tuesday, Sept 16, 17
First Term begins—Registration Day... 8 A. M. Tuesday, September 17
Lectures and Class-work begin .....8 A. M. Wednesday, September 18
President's Annual Address.....11 A. M. Friday, September 20
Thanksgiving Recess..... .....Thursday and Friday, Nov. 28, 29
Latest Date for Announcing Subjects of Theses..... } Saturday, December 14
First Term ends .....4 P. M. Wednesday, December 18
Christmas Vacation

1902

Second Term begins--Registration Day..8 A. M. Thursday, January 2
University Day.....Saturday, February 22
Second Term ends.....4 P. M. Friday, April 4
Spring Recess

Third Term begins—Registration Day...8 A. M. Wednesday, April 9
Field Day, Athletic Association.....Saturday, May 17
Senior Vacation begins .....Saturday, May 24
Competitive Drill, Cadet Battalion.....Saturday, May 24
Memorial Day.....Friday, May 30
Latest Date for Presenting Thesis.....Saturday, June 7
Latest Date for Filing Bound Copy.... of Thesis..... } Friday, June 13
Baccalaureate Sermon ....Sunday, June 15
Entrance Examinations .....Monday and Tuesday, June 16, 17
Class Day.....Monday, June 16
Alumni Day .....Tuesday, June 17
Commencement.....Wednesday, June 18
Summer Vacation

Session of Lake Laboratory at Sandusky..June 30 to August 22
Entrance Examinations .....Monday and Tuesday, Sept. 22, 23
First Term begins—Registration Day....8 A. M. Tuesday, September 23
Lectures and Class-work begin.....8 A. M. Wednesday, September 24
President's Annual Address.....11 A. M. Friday, September 26

OHIO STATE UNIVERSITY

HISTORY

The land grant made by the United States under an act approved by President Lincoln, July 2, 1862, provided that there should be granted to each State an amount of public land equal to thirty thousand acres for each Senator and Representative to which the State was entitled by the apportionment of the census of 1860. The proceeds under this act were to constitute a perpetual fund, the capital of which was to remain forever undiminished and the interest of the same was to be inviolably applied by each state that should take and claim the benefits of the act to the endowment, support and maintenance of at least one "college where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanical arts, in such a manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Governor Tod, in November, 1862, brought the subject before the State Board of Agriculture, and later to the attention of the legislature. In January, 1864, Hon. Columbus Delano introduced a bill accepting the grant. This became a law February 9, 1864, and pledged the faith of the state to the performance of all the conditions and provisions contained therein. In 1866 an act, introduced by Hon. J. T Brooks, was passed which provided for the establishment of the Ohio Agricultural and Mechanical College; but the provisions were not carried into effect; and a second act, introduced by Hon. R. P. Cannon, was passed in 1870, entitled "An act to establish and maintain an Agricultural and Mechanical College in Ohio." Under the provisions of this act the institution was located in Columbus; and the board proceeded to the organization of the college and the election of a faculty of instruction: and the institution was opened for the reception of students on the seventeenth day of September, 1873.

In 1878 the legislature passed "An act to reorganize and change the name of the Ohio Agricultural and Mechanical College and to repeal certain acts therein mentioned." The act provided that the institution should be thereafter designated as "The Ohio State University." Up to this time but one appropriation had been made by the state for the support of the institution. With the reorganization came the larger and broader view of the

state's relation to public education ; and since that time the Ohio State University has enjoyed with other public educational institutions a more generous support by the state.

The governing body of the institution is a board of seven trustees, appointed by the governor of the state and confirmed by the senate, for terms of seven years as provided in the law organizing the University. The original endowment has been supplemented and the objects of the University promoted by a permanent annual grant from the United States, under an act of 1890 ; by special appropriations of the General Assembly ; and in 1891, by a permanent annual grant from the state, which grant was doubled by the legislature of 1896. In accordance with the spirit of the law under which it is organized, the University aims to furnish ample facilities for education in the liberal and industrial arts, the sciences and the languages, and for thorough technical and professional study of agriculture, engineering in its various departments, veterinary medicine, pharmacy and law. Through the aid which has been received from the United States and from the state it is enabled to offer its privileges, with a slight charge for incidental expenses, to all persons of either sex who are qualified for admission.

LOCATION OF THE UNIVERSITY

The University is situated within the corporate limits of the city of Columbus, two miles north of the Union Station and about three miles from the state Capitol. The University grounds consist of three hundred and forty-five acres, bounded east and west by High Street and the Olentangy River, respectively. The western portion, about 235 acres, is devoted to agricultural and horticultural purposes, and is under the management of the College of Agriculture and Domestic Science. The eastern portion is occupied by the principal University buildings, campus, athletic and drill grounds, a park-like meadow, and a few acres of primitive forest.

The grounds are laid out with care, and ornamented with trees, shrubs and flower beds ; and are so managed as to illustrate the instruction in botany, horticulture, forestry, landscape gardening and floriculture.

The University may be reached by either the North High Street or Neil Avenue electric cars. Those wishing to go to the principal buildings of the University, to the residences on the grounds, or to the athletic field, should take a High Street car going north. Those wishing to visit the Emerson McMillin Observatory, the Veterinary Hospital, Townshend Hall, Horticultural Hall or the dormitories, will find the Neil Avenue cars more convenient.

The University has thirteen buildings devoted to instruction, a boiler house, power house, two dormitories, six residences and several farm buildings. These structures represent an investment for construction of about eight hundred thousand dollars. The equipment and apparatus amount to about one hundred and seventy thousand dollars. The land now occupied as a site, with the farm, is valued at one million five hundred thousand dollars.

EXPENSES

The incidental fee of eighteen dollars a year is charged to all students (except those holding scholarships), and is payable one-third at the opening of each term. The laboratory fees are charged to such students (except those holding scholarships),as pursue courses in sciences having fees attached. These are detailed in the University catalogue.

The cost of living, which is the chief item of expense, is as reasonable in Columbus as in most college towns. Furnished rooms may be secured at prices ranging from one dollar a week upward, and the cost of table board is from two dollars and twenty-five cents upward. The uniform required of all members of the battalion costs about fourteen dollars. In the matter of expense much is dependent upon the personal taste and habits of the student. There is nothing about the State University requiring a large expenditure of money; economy and careful living are the rule. The University distinctly encourages these things, and will use every means to discourage a lavish expenditure of money as inconsistent with the best interests of the student or of college life. Two hundred and fifty dollars may be regarded as sufficient money to provide for reasonable expenses for a year at the University.

For information as to text books, etc., apply to F. R. West, University Supply Store, Columbus.

AIDS TO MORAL AND RELIGIOUS CULTURE

A weekly convocation is held at 10 o'clock on Wednesdays in the University Chapel. During this hour all other University exercises are suspended; and the entire Faculty and student body are expected to attend this exercise. It consists of a brief devotional service, followed by an address by the President, some member of the Faculty, or an invited guest

One of the most commendable organizations in the University is a branch of the International Young Men's Christian Association, organized in 1883. This association is directly affiliated with the work for young men directed by the college department of the State Y. M. C. A. work. Services are held weekly, and voluntary classes for Bible study are successfully organized. The local association has a secretary who devotes his entire time to work among the young men. The management has rented a house at 71 Eleventh Avenue as a headquarters for the Association. It is hoped that in the near future a permanent home for the Association may be provided.

An equally commendable organization is the Young Women's Christian Association, affiliated with the State organization. Religious meetings are held regularly at noon on Tuesdays. Occasionally meetings for social purposes are held as providedfor by the organization. Both of these organizations are worthy of public consideration.

New students are invited to write to the address below for a hand book of information concerning the University or for information concerning rooms, boarding or employment. Address, J. P. Davies, 71 Eleventh Avenue, Columbus.

LITERARY AND OTHER SOCIETIES

The Alcyone Literary Society, open to young men, was founded in 1874; the Horton Literary Society, open to young men, was founded in 1875; the Athenæan Literary Society, open to young men, was founded in the winter of 1896-'97. The Browning Literary Society, founded in 1883, and the Philomathean Literary Society, founded in 1894, are open to young women. These societies have commodious and well furnished apartments in University Hall. They meet weekly, and their work, offering to the student a very desirable training in composition, public speaking, and parliamentary order, is a valuable adjunct to collegiate education.

The Townshend Literary Society was established in 1883 as a technical society under the name of the Kirtland Agricultural Society. In 1894, the name Townshend was substituted. In 1898, the Society changed its constitution so as to admit any student of the University and thus became a literary rather than a technical society. It meets weekly in its commodious and well arranged society room in Townshend Hall.

There are numerous other organizations, membership in nearly all of which is open to all students. Their various objects are sufficiently indicated by the following titles: the Biological Club, the Chemical Association, the Political Science Club, the Engineering Society, the Sketch Club, the English Club, the Dramatic Club, the Glee Club, the Mandolin and Guitar Club, the Banjo Club, the Orchestra, the Male Quartet and the Cadet Band.

MILITARY SCIENCE AND TACTICS

Under the law of Congress establishing the University, it is required that instruction shall be given in military science and tactics. In accordance with this provision an officer of the regular army has been detailed to take charge of the Department of Military Science and Tactics; and the Trustees have directed that all male students, except those in the Law College, and such others as may be specially excused for physical disability or for having reached the age limit of twenty-five years, shall render two years of cadet service as a condition of graduation. A uniform has been prescribed with which each member is required to provide himself; and fifty minutes a day are devoted to drill, except on those days when instruction in tactics and art of war is given.

CADET SERVICE AND GYMNASIUM

From the opening of the year until the Thanksgiving recess cadet service is required four times a week ; from Thanksgiving until the Spring recess cadet service is required twice each week and gymnasium practice twice ; from the Spring recess until the first of June cadet service is required four times each week.

The gymnasium is free to all students ; those desiring a locker will be charged a fee of one dollar a term.

PHYSICAL EDUCATION

The Gymnasium is a large modern building, completed in 1898. The basement is used for lockers, dressing rooms and baths. The east end is used by the young women, the west end by the young men. Each end has separate shower and plunge baths.

The exercising floor, 80x150 feet, is thoroughly equipped with the best apparatus in duplicate. The running track is fourteen laps to the mile, with graded elevations at the curve to meet the requirements of the different rates of speed. The track is laid with felt an inch in thickness, three and a half feet wide and covered with rubber coated canvas.

The work is compulsory for the first and second year students. The course consists of theoretical and practical work in the gymnasium, and includes calisthenics, light and heavy gymnastics, physiology of exercise, physical examinations and measurements. It is inte ıded to give the student such a training in the methods of Physical Education that he may have a comprehensive knowledge of the subject.

A thorough physical examination of each student is made at the opening of the year, and the measurements are outlined on charts, so as to show the parts below the normal development, for which special exercises suited to the health and physical condition of each individual will be suggested. These charts are constructed from the accumulated data of several thousand measurements of college students. Experience demonstrates that the body, as well as the mind, is susceptible of right and wrong development. Every part of the body can be strengthened and increased ; and the relation of one part to another can also be changed so as to correct imperfections.

Class leaders who act as floor aids are selected from among those that show a proficiency in the work. These students are given a certificate of their appointment as Aids, and the letter A in scarlet, which they are entitled to wear on their gymnasium suits.

It is the aim of the department to secure health, vigor and such harmonious development of the body as will fit it to resist disease and prepare it for efficient service, both now and later in life.

THE UNIVERSITY

The Ohio State University is divided into six Colleges, as follows :

The College of Agriculture and Domestic Science.
The College of Arts, Philosophy and Science.
The College of Engineering.
The College of Law.
The College of Pharmacy.
The College of Veterinary Medicine.

The College of Agriculture and Domestic Science consists of those departments represented in the courses leading to the degrees of Bachelor of Science in Agriculture, Bachelor of Science in Horticulture and Forestry, and Bachelor of Science in Domestic Science ; in the Short Course in Agriculture, in the Short Course in Domestic Science, and in the Course in Dairying.

The College of Arts, Philosophy and Science consists of those departments represented in the courses leading to the degrees Bachelor of Arts, Bachelor of Philosophy, and Bachelor of Science.

The College of Engineering consists of those departments represented in the courses leading to the degrees of Civil Engineer, Engineer of Mines, Engineer of Mines in Ceramics, Mechanical Engineer, Mechanical Engineer in Electrical Engineering, Bachelor of Science in Industrial Arts, and Bachelor of Science in Chemistry or in Metallurgy; in the Course in Architecture, in the Short Course in Clay-working and Ceramics, and in the Short Course in Mining.

The College of Law consists of those departments represented in the course leading to the degree of Bachelor of Laws.

The College of Pharmacy consists of those departments represented in the courses leading to the degree of Bachelor of Science in Pharmacy, and in the Short Course in Pharmacy.

The College of Veterinary Medicine consists of those departments represented in the course leading to the degree of Doctor of Veterinary Medicine, and to a certificate of Veterinary Surgeon.

Each College is under the direction of its own Faculty, which has power to act in all matters pertaining to the work of students in that College.

UNIVERSITY CATALOGUE

The general annual Catalogue of the University will appear in August, 1901. All persons desiring more detailed information in regard to this College (as to the full list of students, description of work in the various departments, etc.) than it has been deemed necessary to publish in this Bulletin, are referred to the University Catalogue, copies of which may be obtained on application to the Executive office, University Hall.

THE COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

This important College has kept pace with the steady and rapid growth of the University. It has always recognized and endeavored to meet the need and demand of the youth of the state for a "good college education." The usual instruction in linguistics, literature, history, mathematics, philosophy and the sciences is offered to all its students; who have, in addition, the advantage of sharing the exceptional facilities afforded by the University for laboratory work. The University library of 35,000 volumes, reinforced by the various department libraries, is an excellent working collection, several thousand dollars being expended each year in the purchase of books.

That these and the other privileges of the College have been appreciated by those who seek an education is shown by the increase in attendance from year to year.

ENROLLMENT

The enrollment of this College for the year 1900-1901 is as follows:

Graduate Students	38
Fourth Year Students	69
Third Year Students	56
Second Year Students	91
First Year Students	136
Special Students	86
Total	476
In the other Colleges	971
Total University Enrollment	1447

DEGREES CONFERRED IN 1900

At the Commencement in June, 1900, the University conferred degrees on 138 candidates. Of these 69 were in the College of Arts, Philosophy and Science; the list being as follows:

ANVANCED DEGREES

MASTER OF ARTS

Lucy Allen, B.A., Columbus; William Edward Bohn, B.A., (German Wallace College), Olmsted Falls; Paul Revere Good, B.A., Westerville; Anna Brewster Hirst, B.A., (Antioch College) Yellow Springs; Wilbur E. Mann, B. Ph., Columbus; John Bernard Parker, B.A., Danville; Zella Vina Robinson, B. Ph., Columbus; Herbert Oswald Williams, B.A., Columbus.

MASTER OF SCIENCE

Washington J. Machwart, B.S., (Muskingum College) Mt. Eaton; Raymond Carroll Osborn, B.Sc., Fargo, N. Dakota.

FIRST DEGREES

BACHELOR OF ARTS

Eliza Doherty Barcus, Columbus; Homer Zurmehly Bostwick, Columbus; J. Loring Courtright, Circleville; John Hervey Eagleson, Columbus; Joseph Pentecost Eagleson, Columbus; Arthur Byron Harward-Columbus; George Melville Karshner,Columbus; William Watts Parmenter, Mt. Vernon; Mary Washington Rice, Columbus; Charles Boyd Sayre, Columbus; George William Stimson, Columbus; Fred Lant Travis, Pana Ill.; John Francis Travis, Green Camp; Earle Downs West, Columbus.

BACHELOR OF PHILOSOPHY

(LATIN COURSE)

Ida May Fisher, Columbus; Anna Faye Howard, Columbus; Richard Thomas Jones, Columbus; Grace Lenore Pitts, Columbus; Margaret Glaze Pulling, Columbus; Mae B. Schaff, Columbus; Lawrence David Thomas, Lancaster; Harry Porter Weld, Marysville.

(MODERN LANGUAGE COURSE)

Edna Alice Andress, Birmingham; Frank Arthur Bohn, Olmsted Falls; Charles Fuller Dowd, Toledo; Hedwig Eloise Gamper, Columbus; Victor Clarence Moon, Columbus; Clara Maud Williams, Columbus; Mary Grace Young, Mt. Vernon.

(ENGLISH COURSE)

Royal Albert Abbott, Columbus; Florence Louise Bell, Columbus; James Henry Burgess, Big Horn, Wyoming; Alice Marie Connor, Columbus; Ellen Josephine Connor, Columbus; Dille Augusta Dill, Columbus; Bertha Webb Eisenbise, Columbus; Ross Garfield Fox, Columbus; Charles Welton Gayman, Canal Winchester; Hattie DeLong Hoffman, Columbus; Allen Brown Jaynes, Columbus; Gordon Donald Kinder, Ottawa; David Klein, Columbus; Caroline Estelle Knight, Columbus; Charles Howard Lisle, Pataskala; Gretchen Pauline Miller, Columbus; Raymond McCallum,

Dayton; Talmadge Archer Rickey, Columbus; Carl Fletcher Roebuck, Dalton; Dudley Scott, Columbus; Charles Tod Singleton, Columbus; Albertine Charlleen Smith, Columbus; Virginia Roletta Smith, Columbus.

BACHELOR OF SCIENCE

Harvey Clinton Dollison, Columbus; Wilbur Latimer Dubois, Cincinnati; Fred James Jeffrey, Columbus; Edgar Howard Moore, Columbus; Walter Leffingwell Redrow, Williamsburg; Raymond Jesse Seymour, Columbus; Abner Andrews Osborn, Columbus.

SUMMARY

ADVANCED DEGREES

Master of Arts	8	
Master of Science	2	10

FIRST DEGREES

Bachelor of Arts	14	
Bachelor of Philosophy		
Latin Course	8	
Modern Language Course	7	
English Course	23	
Bachelor of Science	7	59
Total		69

COLLEGE OF ARTS, PHILOSOPHY AND SCIENCE

FACULTY AND INSTRUCTORS

REV. WILLIAM OXLEY THOMPSON, D. D.....University Grounds
President of the University.

ALLEN CAMPBELL BARROWS, D. D.....85 Tenth Avenue
Dean, and Professor of English Literature.

WILLIAM HENRY SCOTT, LL. D.....131 Fifteenth Avenue
Professor of Philosophy.

SIDNEY AUGUSTUS NORTON, LL. D.....363 East Town Street
Emeritus Professor of Chemistry.

SAMUEL CARROLL DERBY, M. A.....93 Fifteenth Avenue
Professor of the Latin Language and Literature.

JOSIAH RENICK SMITH, M. A.....950 Madison Avenue
Professor of the Greek Language and Literature.

BENJAMIN FRANKLIN THOMAS, Ph. D.....University Grounds
Professor of Physics, and State Sealer of Weights and Measures.

GEORGE WELLS KNIGHT, Ph. D.....University Grounds
Professor of American History and Political Science.

ROSSER DANIEL BOHANNAN, B. Sc., C. E., E. M.....16th and Indianola Avenues
Professor of Mathematics.

ERNST AUGUST EGGERS.....190 Eleventh Avenue, University Grounds
Professor of Germanic Languages and Literatures.

ALBERT MARTIN BLEILE, M. D.....218 King Avenue
Professor of Anatomy and Physiology.

WILLIAM ASHBROOK KELLERMAN, Ph. D.....175 Eleventh Avenue
Professor of Botany.

BENJAMIN LESTER BOWEN, Ph. D.....775 East Broad Street
Professor of Romance Languages and Literatures.

JOSEPH VILLIERS DENNEY, B. A.....230 Tenth Avenue
Professor of Rhetoric and English Language.

J. P. GORDY, LL. D..... .....350 W. Seventh Avenue
Professor of Education.

WILLIAM McPHERSON, D. Sc., Ph. D..... .....65 Hamilton Avenue
Professor of Chemistry.

HERBERT OSBORN, M. Sc.....485 King Avenue
Professor of Zoology and Entomology.

HENRY CURWEN LORD, B. Sc..... .....University Grounds
Professor of Astronomy, and Director of the Emerson McMillin Observatory.

CHRISTOPHER P. LINHART, M. D..... . ...The Vendome
Professor of Physical Education, and Director of the Gymnasium.

GEORGE L. CONVERSE, Captain (retired) U. S. A.....398 Oak Street
Professor of Military Science and Tactics.

FREDERICK CONVERSE CLARK, Ph. D.....1634 Neil Avenue
Professor of Economics and Sociology, and Secretary of the Faculty.

OLIVE B. JONES..... .....53 Eleventh Avenue
University Librarian.

WILBUR HENRY SIEBERT, M. A..... .....1332 Highland Street
Associate Professor of European History.

GEORGE WASHINGTON McCOARD..... .....325 W. Sixth Avenue
Associate Professor of Mathematics.

CHARLES WALTER MESLOH, M. A.....University Grounds
Associate Professor of Germanic Languages and Literatures.

ARTHUR WINFRED HODGMAN..... .....164 W. Ninth Avenue
Associate Professor of the Classic Languages.

CHARLES SMITH PROSSER, M. Sc.....1362 Highland Street
Associate Professor of Historical Geology.

JOHN ADAMS BOWNOCKER, D. Sc.....1594 Neil Avenue
Associate Professor of Inorganic Geology, and Curator of the Museum.

CLARA MAUD BERRYMAN..... .....175 Eleventh Avenue
Associate Professor of Physical Education.

JAMES ELLSWORTH BOYD, M. Sc.....25 Maynard Avenue
Assistant Professor of Physics.

JOSEPH RUSSELL TAYLOR, M. A.....222 King Avenue
Assistant Professor of English Literature.

WILLIAM LUCIUS GRAVES, M. A.....1313 Forsyth Avenue
Assistant Professor of Rhetoric.

CHARLES LINCOLN ARNOLD, M. Sc. .....328 W. Eighth Avenue
Assistant Professor of Mathematics.

JAMES STEWART HINE B. Sc.....26 W. Fourth Avenue
Assistant Professor of Entomology.

CHARLES A. BRUCE, B. A. .....234 Tenth Avenue
Assistant Professor of Romance Languages.

JOHN H. SCHAFFNER, M. Sc.....61 Eleventh Avenue
Assistant Professor of Botany.

CHARLES BRADFIELD MORREY, B. A., M. D.....86 King Avenue
Assistant Professor of Anatomy and Physiology.

WILLIAM EDWARDS HENDERSON, Ph. D.....41 Eleventh Avenue
Assistant Professor of Analytical Chemistry.

KARL DALE SWARTZEL, M. Sc.....57 E. Eighth Avenue
Assistant Professor of Mathematics.

GEORGE H. McKNIGHT, Ph. D.....312 W. Seventh Avenue
Assistant Professor of Rhetoric and English Language.

HERRICK CLEVELAND ALLEN, LL. B.....275 East Gay Street
Assistant Professor of Public Speaking.

WALLACE STEDMAN ELDEN, PH. D.....1462 Neil Avenue
Assistant Professor of the Classic Languages.

FRANCIS LEROY LANDACRE, B. A.....1332 Highland Street
Assistant Professor of Zoology.

FREDERICK EDWARD KESTER, M. A.....1473 Neil Avenue
Instructor in Physics.

ALONZO HUBERT TUTTLE, B. A. .....215 Tenth Avenue
Instructor in American History.

ARTHUR ERNEST DAVIES, M. A., PH. D.....Seventeenth Avenue
Instructor in Philosophy.

J. WARREN SMITH.....55 Cleveland Avenue
Lecturer on Meteorology.

DON CARLOS HUDDLESON, G. PH.....249 West Lane Avenue
Assistant in Gymnasium.

FRANCIS MARION HAMILTON, B. A.....1355 North High Street
Assistant in Philosophy and Education.

MELVIN DRESBACH, M. Sc.....236 West Eighth Avenue
Assistant in Anatomy and Physiology.

HERBERT CHARLES GORE, B. Sc.....185 West Ninth Avenue
Assistant in Chemistry.

SAMUEL EUGENE RASOR, B. Sc. .....1594 Neil Avenue
Assistant in Mathematics.

EDGAR HOWARD MOORE, B. Sc.....475 West Fourth Avenue
Assistant in German.

RICHARD T. JONES, B. PH.....172 Seventeenth Street
Assistant in Romance Languages.

SARAH T. BARROWS.....85 Tenth Avenue
Assistant in German.

WILLIAM EDWARD BOHN, M. A.....47 West Eighth Avenue
Fellow in Rhetoric.

HARRIET GRISWOLD BURR, B. A..... Worthington
Fellow in Botany.

CHARLES HUBBELL KIMBERLY, B. Sc.....1300 Neil Avenue
Fellow in Chemistry.

JOHN FRANCIS TRAVIS, B. A.....239 Tenth Avenue
Fellow in Mathematics.

CLARENCE PHILANDER LINVILLE, B. Sc.....61 West Eighth Avenue
Fellow in Chemistry.

WILBUR LATIMER DUBOIS, B. Sc.....61 West Eighth Avenue
Fellow in Chemistry.

SELDEN F. SMYSER.....1451 Worthington Street
Fellow in Economics.

ELMER DARWIN BALL, M. Sc.....1340 Hunter Street
Fellow in Zoology and Entomology.

CHARLES BOYD SAYRE, B. A.....716 Neil Avenue
Fellow in American History and Political Science.

WALTER FISCHER, B. Sc.....810 Franklin Avenue
Fellow in Botany.

DANFORTH E. BALL.....565 East Broad Street
Emerson McMillin Fellow in Astronomy.

ROYAL ALBERT ABBOTT.....1364 Forsyth Avenue
Fellow in Rhetoric.

STANDING COMMITTEES OF THE FACULTY

Executive: Dean Barrows (*ex officio*), Secretary Clark (*ex officio*), Professors Eggers, Lord, Osborn and Thomas.

On Admission to Advanced Standing: Professor Thomas (chairman), Professors Denney and Smith.

On Admission to Graduate Work: Professor Gordy (chairman), Professors Smith and Prosser.

ADMISSION

The University is open on equal terms to both sexes.

The entrance examinations for 1901 will be held on Monday and Tuesday, June 17 and 18, and on Monday and Tuesday, September 16 and 17. A part of the examinations may be taken in June and the remainder in September. Conditions incurred at the June examinations must be removed at the September examinations.

Applicants must be at least sixteen years of age; and must be provided with credentials of scholarship from the last instructors or from the last institution with which they have been connected, and with a certificate of good moral character.

There are three modes of admission to the University:

1. Certificates of the preparatory departments of colleges of approved standing and of normal schools in Ohio are accepted, if found satisfactory, in lieu of examination for preparatory studies, under the following conditions:

Each certificate must contain a detailed statement of the studies pursued, the text-books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination, and the applicant's rank or standing in it. A copy of the course of study should accompany the certificate; and both should be sent to the University not later than the first of September. The University cannot promise this recognition to those certificates presented during entrance week.

Blank certificates will be furnished upon application.

Applicants for admission who come from other colleges or universities are required to bring certificates of honorable dismissal.

Teachers' certificates (in force) will be accepted at their face value.

2. From time to time the University approves the courses of study in certain high schools of the state; and the graduates of these high schools are admitted on presentation of cards issued to them at their graduation by the University through the principals of the high schools.

3. All other applicants are subject to examination on the groups of study mentioned below under the heading of the course in the college which they desire to enter.

Full equivalents for the text-books named will be accepted.

The following are the subjects which may be presented for admission to this College of the University; the specific requirements and options under each Course are given below.

1. Arithmetic, Descriptive and Physical Geography, English Grammar and United States History.

2. *English Composition and Euglish Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, or equivalents: Shakespeare's *Merchant of Venice*, *Julius Caesar*, and *Macbeth;* Milton's *Lycidas*, *Comus*, *L'Allegro and Il Penseroso;* Burke's *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison;* The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in compostion-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principles of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhe toric is recon mended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents, and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of all of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

3. *Algebra*—Taylor's Academic or equivalent.

4. *Botany*—Kellerman's Elementary Botany and Spring Flora or equivalent.

5. *Civil Government*—Fiske or Thorpe preferred.

6. *Geometry, Plane and Solid*—Venable, White, Wentworth or Wells.

7. *Greek*—Grammar (Goodwin's preferred) and prose composition; or the whole of White's First Greek Book. Reading: the first three books of Xenophon's *Anabasis*. At least two years should be devoted to this work.

8. *History*—Either Myers' General History, Fisher's Short History of the Nations, or Adams' European History; or Greek and Roman History.

9. *Latin*—Pronunciation (the Roman method): Grammar (an exact knowledge of the inflections is essential); Cæsar, the first four books of the *De Bello Gallico*; Cicero, six orations, including *Pro Lege Manilia*; Vergil, the first six books of the *Aeneid*, with prosody; Prose Composition, Daniell or Collar or Jones or Dodge and Tuttle, entire.

10. *Physics*—Carhart and Chute, Gage, Avery or Appleton.

11. *French*—Applicants should be able to pronounce French accurately, to read at sight easy French prose, to put into French simple English sentences taken from the language of everyday life, or based upon a portion of the French text read, and to answer questions on the rudiments of the grammar as defined below.

Two years should be given to this preparation.

During the first year the work should comprise: (1) Careful drill in pronunciation; (2) the rudiments of grammar, including the inflection of the regular and the more common irregular verbs, the plural of nouns, the inflection of adjectives, participles and pronouns; the use of personal pronouns, common adverbs, prepositions and conjunctions; the order of words in the sentence, and the elementary rules of syntax; (3) abundant easy exercises, designed not only to fix in the memory the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (4) the reading of from 100 to 175 duodecimo pages of graduated texts, with constant practice in translating into French easy variations of the sentences read (the teacher giving the English), and in reproducing from memory sentences previously read; (5) writing French from dictation.

During the second year the work should comprise: (1) The reading of from 250 to 400 pages of easy modern (nineteenth century) prose in the form of stories, plays or historical or biographical sketches; (2) constant practice, as in the previous year, in translating into French easy variations upon the texts read; (4) writing French from dictation; (5) continued drill upon the rudiments of grammar, with constant application in the construction of sentences; (6) mastery of the forms and use of pronouns, pronominal adjectives, of all but the rare irregular verb forms, and of the simpler uses of the conditional and subjunctive.

12. *German.*—

(a) The aim of the instruction.

At the end of the elementary course in German the pupil should be able to read at sight, and to translate, if called upon, by way of proving his ability to read, a passage of very easy dialogue or narrative prose, help

being given upon unusual words and constructions; to put into German short English sentences taken from the language of everyday life or based upon the text given for translation, and to answer questions upon the rudiments of grammar as defined below.

(b) The work to be done.

During the first year the work should comprise: (1) Careful drill upon pronunciation; (2) the memorizing and frequent repetition of easy colloquial sentences; (3) drill upon the rudiments of grammar, that is, upon the inflection of the articles, of such nouns as belong to the language of everyday life, of adjectives, pronouns, weak verbs, and the more usual strong verbs, also upon the use of the more common prepositions, the simpler uses of the model auxiliaries, and the elementary rules of syntax and word-order; (4) abundant easy exercises designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (5) the reading of from 75 to 100 pages of graduated texts from a reader, with constant practice in translating into German easy variations upon sentences selected from the reading lesson (the teacher giving the English), and in the reproduction from memory of sentences previously read.

During the second year the work should comprise: (1) the reading of from 150 to 200 pages of literature in the form of easy stories and plays (2) accompanying practice, as before, in the translation into German of easy variations upon the matter read, and also in the off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; (3) continued drill upon the rudiments of the grammar, directed to the ends of enabling the pupil, first, to use his knowledge with facility in the formation of sentences, and, secondly, to state his knowledge correctly in the technical language of grammar.

13. *Chemistry*—Williams or Remsen.

14. (a) *English Literature*—Pancoast's Introduction to English Literature and an acquaintance with representative works in each period; or (b) *English History*—Montgomery.

15. *Physiology*—Martin (briefer course).

ADMISSION TO SPECIAL STUDIES

Students who desire to pursue special lines of work in any of the Colleges of the University, and do not desire to become candidates for degrees, will be admitted on the following conditions:

1. The regular entrance requirements must be satisfied.

2. But applicants who are not less than twenty-one years of age after obtaining credit for the common English branches and for such other subjects as may be necessary to qualify them for the classes that they wish to enter, may, on the presentation of satisfactory reasons, be admitted to any class in the College; provided, that if any student who has been admitted

on these conditions afterwards becomes a candidate for a degree, he shall pass the omitted entrance examinations at least twelve months before the degree is conferred.

3. On entering the College, students desiring to pursue special work are required to lay before the Executive Committee, for approval or modification, a written statement of the end they have in view, the studies proposed for the attainment of that end, and the probable period of attendance. Such students will be held as strictly to their accepted schemes of work as are the regular undergraduates to their courses of study.

4. Permission to enter as special undergraduates will be refused to all who fail to give satisfactory evidence of definiteness of purpose, and will be withdrawn whenever the conditions on which it was granted cease to exist.

ADMISSION TO ADVANCED STANDING

1. Applicants who do not come from some other university or college must first obtain admission to the College in the manner already described. They will then be examined on the undergraduate studies for which they ask credits.

2. Applicants who come from the collegiate department of an approved College, and who bring explicit and official certificates describing their course of study and scholarship, and also certificates of honorable dismissal, will be admitted without examination except such as may be necessary to determine what credit they are to receive here for work done in the college from which they come.

ADMISSION TO GRADUATE WORK

Graduates of this or other institutions may, on application to the Committee on Admission to Graduate Work, enter the College and pursue such lines of work as may be arranged or approved by the Executive Committee. Such graduate students are subject to all the ordinary regulations (as to fees, attendance, etc.), prescribed for undergraduates. A circular describing the graduate work will be mailed to any applicant.

ADVANCED DEGREES

1. The degree of Master of Arts will be conferred upon candidates holding the degree of B. A. or B. Ph. from this University or from other institutions making equivalent requirements for those degrees, upon the satisfactory completion, during not less than one year of residence (devoted exclusively to such work), of an approved course of study, covering a major subject and an allied minor subject. The major subject (two thirds) shall be graduate work, taken in one of the departments of the Arts, Philosophy and Science College. The minor subject (one third) may be in graduate work.

2. The degree of Master of Science will be conferred upon candidates holding the degree of Bachelor of Science from the General Science Course of this University or from institutions making equivalent requirements for this degree, and also upon graduates from the College of Engineering of this University, upon the terms specified for the degree of Master of Arts; except that the major subject must be taken in one of the departments of Science in the Arts, Philosophy and Science College. The minor subject must be in an allied science.

3. The degree of Master of Arts will be conferred upon candidates holding the degree of Bachelor of Arts or Bachelor of Philosophy and the degree of Master of Science upon candidates holding the degree of Bachelor of Science from this University or from other institutions making equivalent requirements for these degrees, and the degree of Master of Science will be conferred on graduates from the College of Engineering of this University, on the completion, during not less than one year of residence, of a course of study in one or more of the departments of the College of Arts, Philosophy and Science, not less than one third of which course must be graduate work and not more than two-thirds may be such undergraduate work as is announced to be elective, such course to be subject to the approval of the Executive Committee of the Faculty of the College of Arts, Philosophy and Science. But a degree conferred under the provisions of this paragraph shall in no case be counted towards the degree of Doctor of Philosophy, or Doctor of Science.

4. With the consent of the Faculty the work of candidates for the Master's degree may be distributed over more than one year.

5. Each candidate for a Master's degree must also prepare and submit a thesis, and after its acceptance, be examined upon the work assigned him.

6. The degree of Doctor of Philosophy or of Doctor of Science will be conferred upon holders of the appropriate baccalaureate degree from this University, or from other institutions making equivalent requirements for the first degree, upon the satisfactory completion of three years of resident graduate work in the Arts, Philosophy and Science College, including thesis and examinations. Holders of the degree of Master of Arts or Master of Science from this University, under the conditions prescribed in paragraph one or two, or from other institutions making equivalent requirements for these degrees, may receive the Doctor's degree on the satisfactory completion of two years of resident graduate work after obtaining the Master's degree. On approval of the Faculty, the work of the first year or of the first two years, of the three, may be done at another university which offers equivalent graduate work.

7. Candidates for the degree of Doctor of Science must take their work wholly in Science.

8. With the consent of the Faculty the work required of candidates for Doctor's degree may be distributed over more than three years.

FELLOWSHIPS

To encourage graduates of this University, and of other similar and approved institutions in this State, to continue their work and to complete the courses necessary to second (and other) degrees, the University authorities have established fellowships in several departments. These demand about one-half of the time of the fellow for laboratory instruction or other similar assistance—as far as possible along the line of his graduate study. The remainder of his time is given to graduate work. The fellowships pay from $250 to $300 for the University year.

Following are the fellowships for the academic year 1901–1902 as far as at present determined:

Anatomy and Physiology, Botany, Chemistry (two), American History and Political Science, Mathematics (two), Philosophy, Rhetoric and English Language.

In addition to these, Mr. Emerson McMillin has established two fellowships: One in Astronomy, $300 for the academic year, and one in Economics, $250 for the academic year.

Correspondence should be directed to the Executive Office of the University.

PRIZES

Through the generosity of Hon. Wm. J. Bryan an annual prize of fifteen dollars is offered for the best essay on the principles underlying the form of government of the United States. Competition for this prize is open to all students of the University.

Other prizes aro offered in special departments, for which see department circulars or the heads of departments.

COURSES OF STUDY

This College offers seven four-year courses of study leading to degrees. All are planned so as to lay first the foundations for investigation in the more important directions, and then, in the more advanced stages of the work, to allow much liberty of election. By the end of the second year all students must have studied two languages, at least one science, mathematics, rhetoric, English literature, history and economics; except that students in General Science omit the literature and add two sciences. Philosophy is required of all in the third year. Thus a student who had insufficient acquaintance with his own tastes and tendencies when he entered the University, and who selected an unsatisfactory curriculum, can rectify the error by transfer, with no very great loss of time.

2. Electives. Elective studies sufficient to bring the total work up to sixteen hours a week in the third year, and to fifteen hours a week in the fourth year, must be chosen from the courses in this College; except that, not earlier than the third year, studies equivalent to five hours a week for one year may be chosen from any courses taught in the University (and five hours more may be chosen by students in General Science from courses in the College of Engineering); provided that the studies are such as the student is qualified to pursue. But restrictions are imposed upon electives in the course in Commerce and Administration. See page 37.

3. Major Study. Not later than the beginning of the third year each student shall elect a major study in one department, or, with the consent of the professors in charge, in two allied departments in this College. To the major study he shall devote not less than four nor more than ten hours a week during the third year, and not less than five nor more than ten hours a week during the fourth year. With the approval of the proper authority, the major study may be entered upon in the second year; an equivalent amount of the work of that year, not in the line of the major study, being postponed to the third year; but the amount so postponed shall not exceed four hours a week: in this case the elective work of the third year will be reduced by a like amount. But see page 41 for the major study in the course in General Science.

4. Thesis. At the beginning of the fourth year each student will take up as thesis work some special line of inquiry within the field of his major study, subject to the approval of the professor in charge of the department, and must devote to it two hours per week, or its equivalent, independently

of his other work. The subject, together with a written approval of it by the head of the department within which it lies, must be submitted to the President of the University, not later than the fifteenth day of December of the fourth year. The complete thesis must be submitted not later than the second Saturday before Commencement Day. But see page 42 for thesis in General Science.

5. No one will be admitted to candidacy for a degree in this College later than the first day of October of his last year.

In the following pages the seven Courses of Study offered by this College are outlined, and each is introduced with a brief statement of its most essential features and aims and of the requirements for admission to it. The student should examine them carefully before making his selection. All members of the Faculty, but the Dean and the members of the Executive Committee most especially, are always glad to advise with the students respecting the choice of a course of study.

The figures in parenthesis following the title of a study indicate the number of that study in the Department Courses, which are fully outlined in the alphabetical order of the Departments, in the pages following these outlines.

The figure not in parenthesis indicates the number of class exercises each week, and the amount of credit assigned to each study.

THE COURSE IN ARTS

Degree: Bachelor of Arts.

From the very beginning, the University has not failed in that part of its duty which is involved in offering a *liberal* education to the youth of the State. In the course leading to the degree of Bachelor of Arts, especial emphasis is laid on the culture and discipline derived from the study of Greek, Latin, and the modern languages and literatures; together with mathematics, history, economics and science. A proper proportion among these studies is assured by the fact that the work of the first two years is mainly prescribed; options being allowed only within the limits of groups. In the third and fourth years the student is permitted a wide election; philosophy being the only study specifically prescribed. This freedom of election is not peculiar to the Course in Arts, and is mentioned only to show that the course is organized on the same broad lines that mark the work of the University in general. It is believed that the curriculum of this course approximates as nearly as is desirable to that of the "one-course" colleges, and that its baccalaureate degree is not inferior in significance to the traditions which attach to that degree elsewhere.

Requirements for Admission—Subjects 1 to 10, inclusive.

For the present, the *Greek* required for admission may be begun at the University, but without University credits.

THE COURSE IN ARTS

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Greek (7) Xenophon's *Hellenica.*	4	Greek (8) Herodotus.	4	Greek (9) Homer's Odyssey.	4
Latin (1) Livy or Cicero.	4	Latin (2) Terence; Plautus.	4	Latin (3) Cicero or Livy.	4
Mathematics (21) College Algebra.	3	Mathematics (22) Plane Trigonometry	3	Mathematics (23) Analytics & Calculus	3
Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3

And one of the following sciences (the choice being for the year):

Botany (21) Chemistry (1) Physics (11) or (2) Zoology (1)	3	Botany (22) Chemistry (1) Physics (11) or (2) Zoology (1)	3	Botany (23) Chemistry (1) Physics (11) or (2) Zoology (1)	3
Cadet Service (Men). Hygiene and Physical Training (Women).		Cadet Service (Men). Hygiene and Physical Training (Women).		Cadet Service (Men). Hygiene and Physical Training (Women).	

SECOND YEAR

Greek (10) Lysias.	4	Greek (11) Plato.	4	Greek (12) Homer's Iliad.	4
Latin (4) Catullus, Tacitus.	4	Latin (5) Horace, Pliny.	4	Latin (6) Propertius, Tibullus.	4
American History (1a) U. S. Political, or Economics (1a) Elementary.	4	American History (1a) U. S. Political, or Economics (1a) Elementary.	2		
		Economics (1b) Elementary, or American History (1b) U. S. Political.	2	Economics (1b) Elementary, or American History (1b) U. S. Political.	4
English Literature (1) Introductory.	2	English Literature (1) Introductory.	2	English Literature (1) Introductory.	2
Rhetoric (2) Expository.	2	Rhetoric (3) Brief-making.	2	Rhetoric (3) Argumentation.	2
Cadet Service (Men). Hygiene and Physical Training (Women).		Cadet Service (Men). Hygiene and Physical Training (Women).		Cadet Service (Men). Hygiene and Physical Training (Women).	

THIRD YEAR

Philosophy (15) Psychology.	4	Philosophy (16) Logic.	4	Philosophy (17) Ethics.	4
Major Study.	4	Major Study.	4	Major Study.	4
Electives.	8	Electives.	8	Electives.	8

FOURTH YEAR

Major Study.	5	Major Study.	5	Major Study.	5
Electives.	10	Electives.	10	Electives.	10
Thesis.	2	Thesis.	2	Thesis.	2

For the Major Study, the Electives and the Thesis, see page 26.

THE LATIN COURSE IN PHILOSOPHY

Degree: Bachelor of Philosophy.

Latin and either French or German form a part of the regular requirements for admission to this course. In it the attempt is made to combine in the language training some of the benefits of the study of a classical language with the advantages of a knowledge of the most important modern tongues. This is its characteristic feature.

In required studies, other than those of language, in the number and range of elective subjects and in the freedom of choice among them, it differs very little from the other non-scientific courses offered in this College.

Requirements for Admission.

Subjects 1 to 6 inclusive, 8, 9, 10, and one of the following: 7, 11, or 12.

Until the year 1902, the *German* or *French* required for admission may be begun at the University, but without University credits. For the year 1902 and thereafter, the full requirements as above stated will be maintained.

THE LATIN COURSE IN PHILOSOPHY

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
French (1) Elementary, or German (1) Elementary.	4	French (1) Elementary, or German (1) Elementary.	4	French (1) Elementary, or German (1) Elementary.	4
Latin (1) Livy or Cicero.	4	Latin (2) Terence; Plautus.	4	Latin (3) Cicero or Livy.	4
Mathematics (21) College Algebra.	3	Mathematics (22) Plane Trigonometry.	3	Mathematics (23) Analytics and Calculus	3
Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3

And one of the following sciences (the choice being for the year):

Botany (21) Chemistry (1) Physics (11) or (2) Zoology (1)	3	Botany (22) Chemistry (1) Physics (11) or (2) Zoology (1)	3	Botany (23) Chemistry (1) Physics (11) or (2) Zoology (1)	3
Cadet Service (Men).		Cadet Service (Men).		Cadet Service (Men).	
Hygiene and Physical Training (Women).		Hygiene and Physical Training (Women).		Hygiene and Physical Training (Women).	

SECOND YEAR

French (2) Modern Literature, or German (4) Intermediate.	4	French (2) Modern Literature or German (4) Intermediate.	4	French (2) Modern Literature or German (4) Intermediate.	4
Latin (4) Catullus, Tacitus.	4	Latin (5) Horace, Pliny.	4	Latin (6) Propertius, Tibullus.	4
American History (1 a) U. S. Political, or Economics (1 a) Elementary.	4	American History (1 a) U. S. Political, or Economics (1 a) Elementary.	2		
		Economics (1 b) Elementary, or American History (1 b) U. S. Political.	2	Economics (1 b) Elementary, or American History (1 b) U. S. Political.	4
English Literature (1) Introductory.	2	English Literature (1) Introductory.	2	English Literature (1) Introductory.	2
Rhetoric (2) Expository.	2	Rhetoric (3) Brief-making.	2	Rhetoric (3) Argumentation.	2
Cadet Service (Men).		Cadet Service (Men).		Cadet Service (Men).	
Hygiene and Physical Training (Women).		Hygiene and Physical Training (Women).		Hygiene and Physical Training (Women).	

THIRD YEAR

Philosophy (15) Psychology.	4	Philosophy (16) Logic.	4	Philosophy (17) Ethics.	4
Major Study.	4	Major Study.	4	Major Study.	4
Electives.	8	Electives.	8	Electives.	8

FOURTH YEAR

Major Study.	5	Major Study.	5	Major Study.	5
Electives.	10	Electives.	10	Electives.	10
Thesis.	2	Thesis.	2	Thesis.	2

For the Major Study, the Electives and the Thesis, see page 26.

THE MODERN LANGUAGE COURSE IN PHILOSOPHY

Degree: Bachelor of Philosophy.

The Modern Language Course in Philosophy is designed to furnish students with special training in both French and German, these two languages taking the place of Greek and Latin in the Course in Arts, or of the Latin combined with one modern language in the Latin Course in Philosophy. Two full years in both of these modern languages are required and the student is given every opportunity to pursue advanced courses in the same subjects.

Requirements for Admission.

Subjects 1 to 6 inclusive, 8, 10, and either 7 and 9, or two of the following: 9, 11, 12.

Until the year 1902, either the *French* or the *German*, (but not both) required for admission may be begun at the University, but without University credits. For the year 1902, and thereafter, the full requirements as above stated will be maintained.

THE MODERN LANGUAGE COURSE IN PHILOSOPHY

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
French (1) or (2) 1st or 2nd year.	4	French (1) or (2) 1st or 2nd year.	4	French (1) or (2) 1st or 2nd year.	4
German (1) or (4) First or 2nd year.	4	German (1) or (4) 1st or 2nd year.	4	German (1) or (4) 1st or 2nd year.	4
Mathematics (21) Algebra.	3	Mathematics (22) Plane Trigonometry.	3	Mathematics (23) Analytics & Calculus,	3
Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3

And one of the following sciences (the choice being for the year):

Botany (21) Chemistry (1) Physics (11) or (2) Zoology (1)	3	Botany (22) Chemistry (1) Physics (11) or (2) Zoology (1)	3	Botany (23) Chemistry (1) Physics (11) or (2) Zoology (1)	3
Cadet Service (Men) Hygiene and Physical Training (Women).		Cadet Service (Men). Hygiene and Physical Training (Women).		Cadet Service (Men). Hygiene and Physical Training (Women).	

SECOND YEAR

French 2nd or 3rd year.	4	French 2nd or 3rd year.	4	French 2nd or 3rd year.	4
German 2nd or 3rd year.	4	German 2nd or 3rd year.	4	German 2nd or 3rd year.	4
American History (1 a) U. S. Political, or Economics (1 a) Elementary.	4	American History (1 a) U. S. Political, or Economics (1 a) Elementary.	2		
		Economics (1 b) Elementary, or American History (1b) U. S. Political.	2	Economics (1 b) Elementary, or American History (1b) U. S. Political.	4
Rhetoric (2) Expository Writing.	2	Rhetoric (3) Brief-making.	2	Rhetoric (3) Argumentation.	
English Literature (2) Introduction.	2	English Literature (2) Introduction.	2	English Literature (2) Introduction.	2
Cadet Service (Men). Hygiene and Physical Training (Women).		Cadet Service (Men). Hygiene and Physical Training (Women).		Cadet Service (Men). Hygiene and Physical Training (Women).	

THIRD YEAR

Philosophy (15) Psychology.	4	Philosophy (16) Logic.	4	Philosophy (17) Ethics.	4
Major Study.	4	Major Study.	4	Major Study.	4
Electives.	8	Electives.	8	Electives	8

FOURTH YEAR

Major Study.	5	Major Study.	5	Major Study.	5
Electives.	10	Electives.	10	Electives.	10
Thesis.	2	Thesis.	2	Thesis	2

For the Major Study, the Electives and the Thesis, see page 26.

THE ENGLISH COURSE IN PHILOSOPHY

Degree: Bachelor of Philosophy.

This Course differs from the preceding three in that it lays less emphasis on the study of the foreign languages, ancient and modern, either in the preparatory school or in the University, substituting for a part of such language work studies in other lines.

From choice or necessity many persons, in their preparatory training, study but one foreign language, and they and others desire to pursue a general university course without devoting so much time as in other courses to linguistic studies. While the University authorities believe that in most cases the study of two languages other than English in preparation for college is advisable and that the further study of these and other foreign languages in the University is desirable, they also believe that for part of these, equivalent work in the English language and in other lines may without detriment be accepted. In this belief the English Course in Philosophy has been framed.

The requirements for admission, which in all other respects are the same as for the other courses in the College, permit the candidate to offer any one of the four languages—Latin, Greek, French, German—and in place of any second foreign language an equivalent amount of training in English literature or English history, chemistry, and physiology; or a second foreign language may be offered in place of the subjects just named.

In the University itself in this course the study of one modern language is required for two years. The special feature of the course is the emphasis laid on the English language, which is studied historically and critically in courses not required elsewhere in the College. Special stress is also laid on European history and on philosophy, both of which are required in greater amount than in other courses. These studies replace the second language required in the first two years of the Arts, Latin, and Modern Language Courses. At the same time full opportunity is afforded in the electives for as complete a study of additional foreign language (modern) as the student may desire.

Experience has shown that the students in this course most naturally specialize, during their last two years, in English language and literature, in philosophy, in history, in political science, or in economics. The course is well adapted for specialization in any one of these fields, and is also an excellent preparation for the professional study of law, or for the pursuit of journalism.

Requirements for Admission.

Subjects 1 to 6 inclusive, 8, 10, and either 7 and 9, or two of the following: 9, 11, 12. But in place of 11 or 12 the applicant may offer subjects 13, 14 and 15.

Until the year 1902, one modern language required for admission may be begun at the University, but without University credits. For the year 1902, and thereafter, the full requirements as stated above will be maintained.

THE ENGLISH COURSE IN PHILOSOPHY

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours.	Third Term	Credit hours
Mathematics (21) Algebra.	3	Mathematics (22) Plane Trigonometry.	3	Mathematics (23) Analytics and Calculus	3
Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3
Rhetoric (15) English Language.	2	Rhetoric (15) English Language.	2	Rhetoric (15) English Language.	2
French (1) or (2) 1st or 2nd Year, or German (1) or (4) 1st or 2nd Year.	4	French (1) or (2) 1st or 2nd Year, or German (1) or (4) 1st or 2nd Year.	4	French (1) or (2) 1st or 2nd Year, or German (1) or (4) 1st or 2nd Year.	4
European History (1) Early Middle Ages.	3	European History (2) Renaissance.	3	European History (3) Modern Europe.	3

And one of the following sciences (the choice being for the year):

Botany (21) Chemistry (1) Physics (11) or (2) Zoology (1)	3	Botany (22) Chemistry (1) Physics (11) or (2) Zoology (1)	3	Botany (23) Chemistry (1) Physics (11) or (3) Zoology (1)	3
Cadet Service (Men). Hygiene and Physical Training (Women.).		Cadet Service (Men). Hygiene and Physical Training Women).		Cadet Service (Men). Hygiene and Physical Training (Women).	

SECOND YEAR.

Rhetoric (2) Expository Writing.	2	Rhetoric (3) Brief-Making.	2	Rhetoric (3) Argumentation.	2
Rhetoric (16) Old English.	2	Rhetoric (16) Old English.	2	Rhetoric (16) Old English.	2
English Literature (2) Introduction.	2	English Literature (2) Introduction.	2	English Literature (2) Introduction.	2
American History (1 a) U. S. Political, or Economics (1 a) Elementary.	4	American History (1 a) U. S. Political, or Economics (1 a) Elementary.	2		
		Economics (1 b) Elementary, or American History (1 b) U. S. Political.	2	Economics (1 b) Elementary, or American History (1 b) U. S. Political.	4
French 2nd or 3rd Year, or German 2nd or 3rd Year.	4	French 2nd or 3rd Year, or German 2nd or 3rd Year.	4	French 2nd or 3rd Year, or German 2nd or 3rd Year.	4
Philosophy (18) Psychology.	3	Philosophy (18) Psychology.	3	Philosophy (19) Psychology.	3
Cadet Service (Men). Hygiene and Physical Training (Women).		Cadet Service (Men). Hygiene and Physical Training (Women).		Cadet Service (Men). Hygiene and Physical Training (Women).	

THIRD YEAR

Philosophy (20) Ethics.	3	Philosophy (21) History of Modern Philosophy.	3	Philosophy (22) History of Modern Philosophy.	3
Major Study.	4	Major Study.	4	Major Study.	4
Electives.	8	Electives.	8	Electives.	8

FOURTH YEAR

Major Study.	5	Major Study.	5	Major Study.	5
Electives.	10	Electives.	10	Electives.	10
Thesis.	2	Thesis.	2	Thesis.	2

For the Major Study, the Electives and the Thesis see page 26.

THE COURSE IN COMMERCE AND ADMINISTRATION

Degree: Bachelor of Philosophy.

The general purpose of this course is to give the student such training as will tend to prepare him for a business career (either for private business as in commerce and trade; or for public business as in administration or an intelligent discharge of the ordinary duties and responsibilities of citizenship).

It is a specialized but not a technical course. It aims at striking a medium between what may be called purely cultural instruction on the one hand and professional instruction on the other.

The following features differentiate its work and purpose from other four year courses in this College:

(1) The studies being selected and arranged with a view to distinct lines of specialization, the principle of limited electives is introduced in the third and fourth years.

(2) Studies in law to the amount of five hours per week for one year are *required* in the third year.

(3) It prepares the student to undertake with greater advantage graduate work in the three departments: American History and Political Science, Economics and Sociology, and European History.

(4) It offers an academic degree for four years of prescribed work which may be recommended as a preparation for the further study of law.

Requirements for Admission.

Subjects 1 to 6 inclusive, 8, 10, and either 7 and 9, or two of the following: 9, 11, 12.

Until the year 1902, either the *French* or the *German*, (but not both) required for admission may be begun at the University, but without University credits. For the year 1902, and thereafter, the full requirements as above stated will be maintained.

THE COURSE IN COMMERCE AND ADMINISTRATION

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Mathematics (21) Algebra.	3	Mathematics (22) Plane Trigonometry.	3	Mathematics (23) Analytics and Calculus.	3
Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3
French (1) or (2) 1st or 2d Year.	4	French (1) or (2) 1st or 2d Year.	4	French (1) or (2) 1st or 2d Year.	4
German (1) or (4) 1st or 2d Year.	4	German (1) or (4) 1st or 2d Year.	4	German (1) or (4) 1st or 2d Year.	4

And one of the following sciences (the choice being for the year):

Botany (21) } Chemistry (1) } Physics (11) or (2) } Zoology (1) } 3	Botany (22) } Chemistry (1) } Physics (11) or (2) } Zoology (1) } 3	Botany (23) } Chemistry (1) } Physics (11) or (2) } Zoology (1) } 3
Cadet Service (men). Hygiene and Physical Training (women).	Cadet Service (men). Hygiene and Physical Training (women).	Cadet Service (men). Hygiene and Physical Training (women).

SECOND YEAR

Rhetoric (2) 2 Expository Writing.	Rhetoric (3) 2 Brief-making.	Rhetoric (3) 2 Argumentation.
English Literature (2) 2 Introduction.	English Literature (2) 2 Introduction.	English Literature (2) 2 Introduction.
American History (1a) } U. S. Political, } or } 4 Economics (1a) } Elementary. }	American History (1a) } U. S. Political, } or } 2 Economics (1a) } Elementary. }	
	Economics (1b) } Elementary, } or } 2 American History (1b) } U. S. Political. }	Economics (1b) } Elementary, } or } 4 American History (1b) } U. S. Political. }
French } 2d or 3d Year, } or } 4 German } 2d or 3d Year. }	French } 2d or 3d Year, } or } 4 German } 2d or 3d Year. }	French } 2d or 3d Year, } or } 4 German } 2d or 3d Year. }
European History (1) 3 Early Middle Ages.	European History (2) 3 Renaissance.	European History (3) 3 Modern Europe.
Cadet Service (men). Hygiene and Physical Training (women).	Cadet Service (men). Hygiene and Physical Training (women).	Cadet Service (men). Hygiene and Physical Training (women).

THIRD YEAR

Philosophy (15) 4 Psychology.	Philosophy (16) 4 Logic.	Philosophy (17) 4 Ethics.
*Law 5 Elementary.	Law 5 Elementary and Contracts.	Law 5 Contracts.
Major Study. 4	Major Study. 4	Major Study. 4

From the courses in the departments mentioned below, selection may be made to make up the required number of hours. Not less than sixteen nor more than eighteen hours a week are permitted, and no substitutions or options further than those indicated below :

American History and Political Science	2 or 3
Economics and Sociology	2 or 3
European History	2 or 3
German	2 or 3
Rhetoric	2 or 3
Romance Language	2 or 3

FOURTH YEAR

Major Study (as in 3rd Year). 5	Major Study (as in 3rd Year). 5	Major Study (as in 3rd Year). 5
Electives (as in 3rd Year). 10	Electives (as in 3rd Year). 10	Electives (as in 3rd Year). 10
Thesis. 2	Thesis. 2	Thesis. 2

For the Major Study, the Electives and the Thesis, see page 26.

*In place of Elementary Law, five hours; Commercial Law five hours may be substituted. Also in place of Contracts, any two of the following may be substituted: Corporations (Private), Insurance, Agency, Sales, Mortgages.

THE COURSE IN EDUCATION.

The postulate that underlies the Course in Education is, there are two lines along which the intending teacher—with a view to his professional interests—should study: (1) the subject he teaches, and (2) the history and science of education and educational psychology. The first point will probably not be challenged by any intelligent person. No one now supposes that a teacher can teach what he does not know.

But there are still many thoughtful people who suppose that teachers are born, not made; that if a man has the natural qualifications of a teacher he can teach, otherwise not, and that that is the end of it. The principle underlying this Course takes sharp issue with this opinion. It assumes that the intending teacher may by study acquire clearer ideas of the end of education, and of sound educational methods. It assumes that the practitioner of the art of education may, like the practitioners of the other arts, do something to put himself in a position in which he will be able to do his work from the standpoint of the experience of the best teachers of the world.

The Requirements for Admission will be the same as for any one of the five preceding courses.

THE COURSE IN EDUCATION

The studies for the first two years will be the same as for any one of the five preceding courses.

THIRD YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Philosophy (15) Psychology.	4	Philosophy (16) Logic.	4	Philosophy (17) Ethics.	4
Education (3).	4	Education (3).	4	Education (3).	4
Major Study.	4	Major Study.	4	Major Study.	4
Electives.	4	Electives.	4	Electives.	4

FOURTH YEAR

Education (5).	4	Education (5).	4	Education (5).	4
Education Electives.	2	Education Electives.	2	Education Electives.	2
Major Study.	5	Major Study.	5	Major Study.	5
Electives.	4	Electives.	4	Electives.	4
Thesis.	2	Thesis.	2	Thesis.	2

For the Major Study, the Electives and the Thesis see page 26.

THE COURSE IN GENERAL SCIENCE

Degree: Bachelor of Science.

This course is intended to meet the needs of students who wish either to become specialists in some branch of science, or to make work in science an important part of their college education.

Recognizing the correlation and mutual dependence of the leading branches of science, training in the fundamentals of botany, chemistry, mathematics, physics, physiology and zoology is required during the first two years of the course. Astronomy and geology are required during the third year. At the beginning of the third year, the student is required to choose as his major subject, "Mathematics, or a Science in which Laboratory Instruction is given." The subject so chosen is to be pursued during the third and fourth years, and the thesis required for graduation is to be taken in the major subject.

Other required subjects are: during the first and second years, modern languages and rhetoric; and during the third year, philosophy. A reading knowledge of both French and German should be possessed by each graduate.

The elective hours of the course, covering one-fourth of the third year and two-thirds of the fourth, may be used by the student either in scientific or in literary subjects.

Requirements for Admission.

Subjects 1 to 6 inclusive, 8, 10, and either 7 and 9, or two of the follow-lowing: 9, 11, 12.

Until the year 1902, either the *French* or the *German*, (but not both) required for admission may be begun at the University, but without University credits. For the year 1902, and thereafter, the full requirements as above stated will be maintained.

THE COURSE IN GENERAL SCIENCE

FIRST YEAR

First Term	Credit hours.	Second Term	Credit hours	Third Term	Credit hours
Mathematics (21) and (24) Algebra, or Trigonometry. (14)	4 5	Mathematics Trigonometry (22) and (24) or Algebra (16) Trigonometry (15).	4 3 2	Mathematics Analytics and Calculus (23) and (24) or Analytics (17).	4 5
Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3	Rhetoric (1) and (21) Paragraph Writing; Oral Discourse.	3
Botany (21) Ecology, or Zoology (1) Comparative.	3	Botany (22) Morphology and Physiology, or Zoology (1) Comparative.	3	Botany (23) Systematic, or Zoology (1) Comparative.	3
French (1) or (2) 1st or 2nd Year, or German (1) or (4) 1st or 2nd Year.	4	French (1) or (2) 1st or 2nd Year, or German (1) or (4) 1st or 2nd Year.	4	French (1) or (2) 1st or 2nd Year, or German (1) or (4) 1st or 2nd Year.	4
Chemistry (1) Elementary (Inorganic).	3	Chemistry (1) Elementary (Inorganic).	3	Chemistry (1) Elementary (Inorganic).	3
Cadet Service (Men).		Cadet Service (Men).		Cadet Service (Men).	
Hygiene and Physical Training (Women).		Hygiene and Physical Training (Women).		Hygiene and Physical Training (Women).	

SECOND YEAR

(*) French 2d or 3d Year, or German 2d or 3d Year.	4	French 2d or 3d Year, or German 2d or 3d Year.	4	French 2d or 3d Year, or German 2d or 3d Year.	4
Physics (2) Mechanics and Heat.	3	Physics (2) Electricity and Magnetism.	3	Physics (2) Sound and Light.	3
Physiology (1) Human Anatomy and Physiology.	3	Physiology (1) Human Anatomy and Physiology.	3	Physiology (1) Human Anatomy and Physiology.	3
American History (1 a) U. S Political, or Economics (1 a) Elementary.	4	American History (1 a) U. S. Political, or Economics (1 a) Elementary.	2		
		Economics (1 b) Elementary, or American History (1 b) U. S. Political.	2	Economics (1 b) Elementary, or American History (1 b) U. S. Political.	4
Cadet Service (men). Hygiene and Physical Training (women).		Cadet Service (men). Hygiene and Physical Training (women).		Cadet Service (men). Hygiene and Physical Training women).	

Together with one of the following subjects, to be continued through the year: (a) Botany (24), three hours credit through the year, or (25), five hours credit through the year. (b) Chemistry (12) and (17), from three to five hours credit through the year. (c)-Mathematics (18), (19) and (20), five hours credit through the year. (d) Zoology (2), from three to five hours credit through the year.

THIRD YEAR

Philosophy (18) Psychology.	3	Philosophy (18) Psychology.	3	Philosophy (19) Logic.	3
Astronomy (1) General.	2	Astronomy (1) General.	2	Astronomy (1) General.	2
(†) Major Study.	4	Major Study.	4	Major Study.	4
Electives.	4	Electives.	4	Electives.	4
and one of the following:					
(‡) Geology (11) Inorganic.	3	Geology (12) Historical.	3	Geology (13) Field.	3
(⁂) Astronomy (2) Practical.	3	Astronomy (2) Least Squares.	3	Astronomy (2) Practical.	3

FOURTH YEAR

Major Study.	5	Major Study.	5	Major Study.	
Electives.	10	Electives.	10	Electives.	10
Thesis.	2	Thesis.	2	Thesis.	2

(*) It is desired that the student on completing this course, shall possess a good reading knowledge of both French and German. Therefore, the student entering on both French and German will take both languages in the University, each for one year. He who enters on one Modern Language will continue that language one year in case he cannot read easy prose at sight, and take the other language for one year. In case a reading knowledge of one Modern Language is possessed, the student will take the other language two years.

(†) Major Study. Not later than the beginning of the Third Year each student in this course shall elect a Major Study in Mathematics or in a Science in which Laboratory instruction is given. This Major Study shall be in one department, or with the consent of the professors in charge, in two allied departments in this college. To the Major Study the student shall devote not less than five hours nor more than ten hours a week during the Fourth Year.

(‡) Students who elect Astronomy (2)through the year must take Geology (11), (12) and (13) through the year in the Fourth Year, if not taken earlier in the course.

(⁂) Students who elect Mathematics as a Major Study must take Astronomy (2) through the year: all others take Geology (11), (12) and (13)through the year.

THESIS.

As a requisite for graduation each student in this course must present an acceptable thesis embodying the results of a special research. The line of research must lie within the field of the major study, and is subject to the approval of the professor or professors having the major study in charge; and the student shall enter on this work not later than the beginning of the fourth year, and shall devote to it not less than two hours a week, or its equivalent, for one year, independently of his other work. The subject of thesis, together with a written approval of it by the professor or professors directing the investigation, must be submitted to the President of the University, not later than the fifteenth of December of the fourth year, and the completed thesis must be submitted not later than the second Saturday before Commencement Day. In case two or more students are pursuing the same major study, a joint research and thesis may be made.

COURSE PREPARATORY TO LAW AND JOURNALISM

In revising the courses of this College, the work heretofore offered as a separate discipline, in the Course Preparatory to Law and Journalism has been incorporated, as required and elective work, in the English Course in Philosophy. Much of this work is now open also to students enrolled in the other courses of this College; none of it has been abandoned or withdrawn.

Students preparing for admission to the College of Law (as candidates for a degree in law) will find suitable and sufficient preparation in the first two years of work prescribed in any one of the four-year courses of the College of Arts, Philosophy and Science.

Students preparing for Journalism will find in the English Course in Philosophy, as now revised, a more thorough preparation than the three-year special course preparatory to Law and Journalism could afford. The requirements for admission remain unchanged. Students preparing for journalism are advised to include among their elective studies as much work in English, Economics, History, Political Science and Elementary Law as their course will permit.

THE DEPARTMENTS.

1901—1902.

In the following exhibit of the courses of study offered by the departments the number of "times" a week always indicates the amount of credit that can be secured by carrying a course of study, and it generally indicates the number of separate exercises a week, whether recitations, lectures or laboratory periods. But in some cases advanced work is done in such a way as to secure the required total amount of work, rather than the specified number of exercises. For fuller information as to the work of any department write for the department circular.

AMERICAN HISTORY AND POLITICAL SCIENCE

(See History).

ANATOMY AND PHYSIOLOGY

(Biological Hall, Rooms 12 and 20).

PROFESSOR BLEILE, ASSISTANT PROFESSOR MORREY,
MR. DRESBACH, MR. BALL.

1. **Human Anatomy and Physiology.** Three times a week, three terms.

4. **Histology and Histo-Chemistry.** Five laboratory periods a week, three terms.

9. **Physiological Laboratory.** Three times a week, three terms.

11. **Physiological Laboratory.** Five times a week, three terms.

12. **Bacteriology.** Twice a week, three terms.

13. **Bacteriology.** Three times a week, three terms.

ANCIENT ART

(See Greek Language and Literature).

ASTRONOMY

(The Emerson McMillin Observatory).

PROFESSOR LORD, MR. SMITH.

1. **General Astronomy.** Twice a week, three terms.
2. **Astronomy, Geodesy and Least Squares.** Three times a week, three terms.
3. **Meteorology.** Twice a week, third term.
4. **Advanced Astronomy.** From three to five hours a week, three terms.

BOTANY

(Botanical Hall)

PROFESSOR KELLERMAN, ASSISTANT PROFESSOR SCHAFFNER, MR. TYLER, MISS BURR, MR. FISCHER.

UNDERGRADUATE COURSES

21. **Ecology.** Three times a week, first term.
22. **Morphology and Physiology.** Three times a week, second term.
23. **Systematic Botany.** Three times a week, third term.
24. **Laboratory and Field Work.** Two or three hours, three terms.
25. **Laboratory Work in Histology and Physiology.** Three to five hours, three terms.
26. **Advanced Laboratory Work in Histology and Microtechnique.** Five times a week, three terms.
27. **Laboratory and Field Work in Systematic Botany.** Three to five times a week, three terms.
28. **Research Work in Systematic Botany.** Five times a week, three terms.

GRADUATE COURSES

29. **Research Work in Morphology and Physiology.** Five or ten times a week, three terms.
30. **Monographic Work.** Five or ten times a week, three terms.
31. **Research Work in Ecology.** Five or ten times a week, three terms.

CHEMISTRY

(Chemical Hall. Rooms, 24, 25, 14, 21, 22, 7 and 18).

PROFESSOR MCPHERSON, PROFESSOR NORTON, ASSISTANT PROFESSOR HENDERSON, MR. GORE.

1. **Elementary Chemistry.** Three times a week, three terms.
2. **Qualitative Analysis.** Three to five times a week, first and second terms.

17. **Inorganic Preparations.** Three to five times a week, third term.

20. **Quantitative Analysis.** Three to five times a week, three terms.

21. **Physical Chemistry;** Advanced General Chemistry. Twice a week, three terms.

8. **Organic Chemistry.** Five times a week, first term.

9. **Organic Chemistry.** Three to five times a week, second and third terms.

15. **Sanitary Analysis.** Four times a week, third term.

25. **Historical Chemistry.** Three times a week, third term.

26. **Chemical Seminary.** Once a week, three terms.

11. **Toxicology.** Four times a week, third term.

27. **Advanced Chemistry.** Five times a week, three terms.

28. **Organic Chemistry.** Twice a week, third term.

29. **Research Work.** Four to ten times a week, three terms.

ECONOMICS AND SOCIOLOGY

(University Hall. Rooms 17 and 18).

PROFESSOR CLARK.

UNDERGRADUATE COURSES

1. **Elements of Political Economy.** Four times a week, first term and twice a week, second term; or twice a week, second term and four times a week, third term.

2. **Industrial Society.** Twice a week, first term.

3. **Industrial and Financial History of the United States.** Twice a week, second term.

4. **Transportation Problems.** Twice a week, third term.

5. **Immigration, Money, Land.** Twice a week, first term.

6. **Railroads, Tariff Crises.** Twice a week, second term.

7. **Labor and Capital.** Twice a week, third term.

8. **Finance and Taxation.** Twice a week, first and second terms.

9. **Money, Credit and Banking.** Twice a week, third term.

10. **Commerce.** Three times a week, three terms.

11. **Sociology.** Three times a week, first and second terms.

12. **Socialism.** Three times a week, third term.

13. **Sociology and Statistics.** Once a week, three terms.

14. **Economic Literature and Legislation.** Once a week, three terms.

15. **Seminary in Economics.** Twice a week, three terms.

16. **Thesis Work.** Twice a week, three terms.

GRADUATE COURSE

17. **Advanced Economics.** From one to ten times a week, three terms.

EDUCATION

(University Hall, Rooms 51 and 54).
PROFESSOR GORDY, MR. HAMILTON.

1. **Educational Psychology.** Three times a week, three terms.
2. **Child Study.** Four times a week, three terms.
3. **History of Education.** Four times a week, three terms.
4. **Methods of Research.** Twice a week, three terms.
5. **Science of Education.** Four times a week, three terms.
6. **Modern Educational Systems.** Twice a week, three terms.
7. **A Study of Scientific Method.** Twice a week, three terms.
8. **The Recitation.** Twice a week, three terms.
9. **Seminar.** Twice a week, three terms.

ENGLISH LITERATURE

(University Hall, Room 31).
PROFESSOR BARROWS, ASSISTANT PROFESSOR TAYLOR.

UNDERGRADUATE COURSES

1. **An Introduction to English Literature.** Twice a week, three terms.

*2. **From Spenser to Milton, exclusive of the Drama.** Twice a week, first term.

*3. **From Dryden to Pope, exclusive of the Drama.** Twice a week, second term.

*4. **The Age of Johnson, exclusive of the Drama.** Twice a week, third term.

*5. **Prose from Burke to the Victorian Age.** Three times a week, first term.

*6. **Poetry from Burns to the Victorian Age.** Three times a week, second and third terms.

7. **The English Bible: The Pentateuch and Earlier Histories.** Once a week, three terms. Given in 1901–'2.

*8. **The English Bible: Later Histories, Poets and Prophets.** Once a week, three terms. Given in 1902–'3.

*9. **The English Bible: The New Testament.** Once a week, three terms. Given in 1903–'4.

10. **The Drama from the Beginning to the Closing of the Theatres.** Three times a week, three terms.

11. **The Modern Novel.** Three times a week, first and second terms.
12. **American Authors.** Three times a week, third term.
13. **Chaucer.** Three times a week, first term.
14. **Milton.** Three times a week, second term.
15. **Modern Plays.** Three times a week, third term.

16. **Literary Problems.** Twice a week, three terms.

17. **Masterpieces; A Study of Literary Types.** Three times a week, three terms.

18. **Victorian Literature.** Twice a week, three terms.

19. **Current Literature.** Twice a week, three terms.

GRADUATE COURSES

20. **Translations.** Twice a week, three terms.

21. **Masterpieces: A Teachers' Course.** Five times a week, three terms.

22. **The Development of Literary Types.** Three times a week, three terms.

*Not given in 1901–'2.

ENTOMOLOGY

(See Zoology and Entomology.)

EUROPEAN HISTORY

(See History.)

GEOLOGY

(Orton Hall, Rooms 1, 4, 5, 7 and 13.)

ASSOCIATE PROFESSOR PROSSER, ASSOCIATE PROFESSOR BOWNOCKER.

11. **Inorganic Geology.** Three times a week, first term.

12. **Historical Geology.** Three times a week, second term.

13. **Field Geology.** Three times a week, third term.

14. **Paleontology.** Two to five times a week, three terms.

15. **Areal Geology.** Two to five times a week, first and third terms.

16. **Advanced Historical Geology.** Three to five hours a week, three terms.

17. **Physiography.** Twice a week, three terms.

18. **Geographic Geology.** Three times a week, third term.

6. **Economic Geology.** Three times a week, second term.

19. **Petrography.** Twice a week, three terms.

GERMANIC LANGUAGES AND LITERATURE

(University Hall, Rooms 32 and 33.)

PROFESSOR EGGERS, ASSOCIATE PROFESSOR MESLOH,
MR. MOORE, MISS BARROWS.

1. **Elementary German.** Four times a week, three terms.

2. **Science Reading.** Two or four times a week, three terms.

4. **Intermediate German.** Four times a week, three terms.

*9. **Classical Drama and Prose.** Three times a week, three terms.
10. **Modern Prose and Drama.** Three times a week, three terms.
11. **Faust.** Twice a week, three terms.
12. **Colloquial Exercises.** Twice a week, first and second terms.
13. **Deutscher Aufsatz.** Twice a week, third term.
*14. **Gothic.** Twice a week, first term.
*15. **Old High German.** Three times a week, second term.
*16. **Middle High German.** Three times a week, third term.
17. **Old Norse.** Twice a week, first term.
18. **History of Germanic Languages.** Twice a week, second term.
19. **Comparative Grammar.** Twice a week, third term.
20. **Sanskrit.** Twice a week, three terms.
21. **Phonetics.** Once a week. first term.
22. **Deutsche Kulturgeschichte.** Once a week, second and third terms.

*Omitted in 1901-'2.

GREEK LANGUAGE AND LITERATURE

(University Hall, Room 37).

PROFESSOR SMITH, ASSOCIATE PROFESSOR HODGMAN, ASSISTANT PROFESSOR ELDEN.

1. **Elementary Greek.** Five times a week, three terms. (No University credit.)
7. **Xenophon: Hellenica.** Four times a week, first term.
8. **Herodotus: Book VII.** Four times a week, second term.
9. **Homer: Odyssey, Books I-IV.** Four times a week, third term.
10. **Lysias: Eight Orations.** Four times a week, first term.
11. **Plato: Apology and Crito.** Four times a week, second term.
12. **Homer: Iliad, Books I-VI.** Four times a week, third term.
13. **Thucydides: Book VII.** Three times a week, first term.
14. **Demosthenes: De Corona.** Three times a week, second term.
15. **Greek Lyric Poets.** Three times a week, third term.
*16. **Attic Drama.** Twice a week, first term.
*17. **Euripides: Alcestis and Medea.** Twice a week, second term.
*18. **Aeschylus: Oresteia.** Twice a week, third term.
19. **Epic Poetry.** Three hours a week, first term.
20. **Greek Comedy.** Three hours a week, second term.
21. **Post-Classical Greek.** Three hours a week, third term.
*22. **Ancient Art.** Twice a week, first and second term.
*23. **Private Life of Greeks.** Twice a week, third term.

*Not offered in 1901-'2.

HISTORY

AMERICAN HISTORY

(University Hall, Rooms 27 and 18)

PROFESSOR KNIGHT, MR. TUTTLE.

UNDERGRADUATE COURSES

1. **Political History of the United States.** Four times a week first term and twice a week second term, or twice a week second term and four times a week third term.

2. **American Colonial History in the Seventeenth and Eighteenth Centuries.** Three times a week, first and second terms.

3. **Constitutional and Political History of the United States, 1776-1800.** Three times a week, third term.

*4. **Constitutional and Political History of the United States, 1800-1829.** Three times a week, first term.

*5. **The Political History of Slavery, 1820-1850.** Three times a week, second term.

*6. **Secession, Civil War, Reconstruction, 1850-1876.** Three times a week, third term.

7. **Historical Material and Its Use.** Once a week, first and second terms.

8. **Topical Research in American History.** Once a week, third term.

9. **Seminary for Research Work.** Twice a week, three terms.

GRADUATE COURSE

10. **Seminary in American History and Institutions.** Two hours a week, three terms.

*Not offered in 1901-'2.

EUROPEAN HISTORY

(University Hall, Rooms 7, 17, 36)

ASSOCIATE PROFESSOR SIEBERT.

1. **Early Middle Ages.** Three times a week, first term.

2. **Renaissance.** Three times a week, second term.

3. **Modern Europe.** Three times a week, third term.

4. **Political and Constitutional History of England.** Three times a week, three terms.

5. **Political and Social History of Greece to the Roman Conquest.** Twice a week, first term.

6. **Roman History and Institutions to the End of the Republic.** Twice a week, second and third terms.

7. **The Protestant Reformation.** Three times a week, first term.

8. **The French Revolution, 1789-1815.** Three times a week, second term.

9. **History of Europe since 1815.** Three times a week, third term.

10. **History of European Colonies.** Three times a week, first and second terms.

11. **The Eastern Question.** Three times a week, third term.

12. **History of France to Middle of Eighteenth Century.** Twice a week, first term.

13. **Documentary and Bibliographical Studies in European History.** Twice a week, second and third terms.

ITALIAN

(See Romance Languages).

LATIN

(University Hall, Rooms 28, 29 and 39.)

PROFESSOR DERBY, ASSOCIATE PROFESSOR HODGMAN, ASSISTANT PROFESSOR ELDEN.

1. **Livy or Cicero.** Four times a week, first term.

2. **Terence: Phormio; Plautus: Trinummus.** Four times a week, second term.

3. **Cicero or Livy.** Four times a week, third term.

4. **Catullus, Tacitus, Horace.** Four times a week, first term.

5. **Horace: Odes; Pliny: Letters.** Four times a week, second term.

6. **Propertius and Tibullus.** Four times a week, third term.

*7. **Tacitus: Historiae or Annales.** Three times a week, first term.

*8. **Juvenal.** Three times a week, second term.

*9. **Martial.** Three times a week, third term.

*10. **Plautus.** Three times a week, first term.

*11. **Cicero: De Finibus or De Officiis.** Three times a week, second term.

*12. **Seneca.** Three times a week, third term.

13. **Lucretius.** Three times a week, first term.

14. **Cicero: De Natura Deorum.** Three times a week, second term.

15. **Horace: Satires and Epistles.** Three times a week, third term.

*16. **Cicero: Rhetorical Works.** Three times a week, first term.

*17. **Later Latin Writers.** Three times a week, second and third terms.

18. **Teachers' Course: Caesar, Cicero and Vergil.** Three times a week, three terms.

19. **Latin Prose Composition.** Twice a week, three terms.

20. **Antiquities.** Twice a week, three terms.

*21. **Latin Literature.** Twice a week, first and second terms.

*22. **Latin Philology.** Twice a week, third term.

23. **Linguistics and Inscriptions.** Twice a week, three terms.
*24. **Advanced Latin Writing.** Twice a week, three terms.
25. **Pro-Seminary: Plautus' Captivi.** Three times a week, three terms.
26. **Pharmaceutical Latin.** Five times a week, three terms.
*Not offered in 1901–'2.

MATHEMATICS

(University Hall, Rooms 39, 41, 43 and 45).
PROFESSOR BOHANNAN, ASSOCIATE PROFESSOR MCCOARD, ASSOCIATE PROFESSOR ARNOLD, ASSISTANT PROFESSOR SWARTZEL, MR. RASOR, MR. TRAVIS, MR. DAVIS, MR. MOORE.

14. **Plane Trigonometry.** Five times a week, first or third term.
15. **Analytical and Spherical Trigonometry.** Twice a week, second term.
16. **College Algebra.** Three times a week, second term.
17. **Plane Analytics.** Five times a week, third term.
18. **Analytics and Differential Calculus.** Five times a week, first term.
19. **Differential Calculus.** Five times a week, second term.
20. **Integral Calculus.** Five times a week, third term.
21. **College Algebra.** Three times a week, first term.
22. **Plane Trigonometry.** Three times a week, second term.
23. **Analytics and Calculus.** Three times a week, third term.
24. **Problems on All Past Work.** Once a week, three terms.
25. **Advanced Mathematics.** From one to ten times a week, three terms.

MILITARY SCIENCE AND TACTICS

(Armory).
PROFESSOR CONVERSE.

1. **Military Drill.** Three times a week, three terms.
2. **Tactics.** Twice a week, second term.
3. **Art of War.** Twice a week, second term.

PHILOSOPHY

(University Hall, Rooms 33, 49, 50 and 51).
PROFESSOR SCOTT, MR. HAMILTON, DR. DAVIES.

15. **General Psychology.** Four times a week, first term.
16. **Logic.** Four times a week, second term.
17. **Ethics.** Four times a week, third term.

18. **General Psychology.** Three times a week, first and second terms.

19. **Logic.** Three times a week, third term.

20. **Ethics.** Three times a week, first term.

21. **History of Modern Philosophy.** Three times a week, second and third terms.

22. **History of Ancient and Mediaeval Philosophy.** Three times a week, first term.

23. **Theories of Ethics.** Three times a week, second and third terms.

24. **Introduction to Philosophy.** Twice a week, first term.

25. **Theory of Knowledge.** Twice a week, second term.

26. **Metaphysics.** Twice a week, third term.

27. **Leading Works in Philosophy.** Twice a week, three terms.

28. **Physiological and Experimental Psychology.** Twice a week, three terms.

PHYSICAL EDUCATION

Professor Linhart, Associate Professor Berryman, Mr. Huddleson.

PHYSICS

(University Hall, Rooms 10, 14, 23 and 24.)

Professor Thomas, Assistant Professor Boyd, Mr. Kester.

2. **Mechanics and Heat, Electricity and Magnetism, Sound and Light.** Five times a week, three terms.

3. **Problems.** Twice a week, three terms.

4. **Electricity and Magnetism.** Three times a week, first term.

11. **General Physics.** Three times a week, three terms.

12. **Laboratory.** Three to five times a week, three terms.

13. **Laboratory.** Three to five times a week, three terms. Follows 12.

14. **Theoretical Physics.** Five times a week, three terms.

15. **Laboratory.** Five times a week, three terms. Follows 13.

PHYSIOLOGY

(See Anatomy and Physiology.)

POLITICAL ECONOMY

(See Economics and Sociology.)

POLITICAL SCIENCE

(University Hall, Room 27.)

PROFESSOR KNIGHT.

11. **Political Institutions of the United States.** Three times a week, first term.

12. **Comparative Political Institutions of England and the United States.** Three times a week, second term.

12. **Comparative Political Institutions of the United States and Continental Europe.** Three times a week, third term.

14. **International Law.** Twice a week, first and second terms.

15. **History of Treaties and Modern Diplomacy.** Twice a week, third term.

*16. **The Government of Dependencies.** Twice a week, first term.

*17. **Colonial Institutions.** Twice a week, second term.

*18. **Municipal Government.** Twice a week, third term.

19. **Origin, History and Interpretation of the United States Constitution.** Twice a week, three terms.

20. **Seminary in Political Science.** Twice a week, three terms.

*Not offered in 1901-2.

RHETORIC AND ENGLISH LANGUAGE

(University Hall. Rooms 38, 40, 42, 44 and 55).

PROFESSOR DENNEY, ASSISTANT PROFESSOR GRAVES, ASSISTANT PROFESSOR MCKNIGHT, ASSISTANT PROFESSOR ALLEN, MR. BOHN, MR. ABBOTT.

UNDERGRADUATE COURSES

1. **Paragraph Writing and Analysis of Prose.** Twice a week, three terms.

2. **Expository Writing.** Twice a week, first term.

3. **Brief Making and Written Argumentation.** Twice a week, second and third terms

4. **Short Story Writing.** Three times a week, first term.

6. **Poetics.** Three times a week, second term.

8. **Theories of Style.** Three times a week, third term.

10. **Advanced Composition.** Once a week, three terms.

12. **Problems in Rhetoric and Criticism.** Twice a week, three terms.

13. **The Teaching of English.** Once a week, three terms.

15. **History of English and Development of Prose.** Twice a week, three terms.

16. **Old English.** Twice a week, three terms.

*17. **Beowulf and Minor Old English Poetry.** Twice a week, three terms.

18. **Middle English Prose and Poetry.** Twice a week, three terms.

21. **Essentials of Oral Discourse.** Once a week, three terms.

23. **Debates.** Twice a week, first and second terms.

24. **Extempore Speaking.** Twice a week, third term.

25. **Oratory.** Twice a week, three terms.

GRADUATE COURSE

20. **Graduate Work.** From two to ten times a week, three terms.

*Not offered in 1901–'2.

ROMANCE LANGUAGES AND LITERATURES

(University Hall, Rooms 35 and 34.)

PROFESSOR BOWEN, ASSISTANT PROFESSOR BRUCE, MR. JONES.

I. FRENCH

1. **Elementary French.** Four times a week, three terms.

2. **Modern French Literature.** Four times a week, three terms.

4. **French Comedy.** Three times a week, first term.

5. **The Dramas of Corneille.** Three times a week, second term.

6. **Seventeenth Century Prose.** Three times a week, third term.

7. **Advanced Prose Composition.** Once a week, three terms.

8. **Literary Criticism in France.** Twice a week, first term.

9. **Recent French Prose.** Twice a week, second term.

10. **Practice in Speaking and Writing French Based on Daudet's Stories.** Twice a week, third term.

*11. **French Travel Writers.** Twice a week, first term.

*12. **Eighteenth Century Prose.** Twice a week, second term.

*13. **Advanced Conversational Practice Based on Coppee and Maupassant.** Twice a week, third term.

*14. **French Seminary A.** Three times a week, three terms.

15. **French Seminary B.** Three times a week, three terms.

*Not offered in 1901-2.

II. ITALIAN

1. **Elementary Italian.** Twice a week, three terms.

III. SPANISH

1. **Elementary Spanish.** Four times a week, three terms.

*2. **Advanced Spanish.** Twice a week, three terms.

*Not offered in 1901-'2.

SANSKRIT

(See Germanic Languages)

SOCIOLOGY

(See Economics and Sociology)

SPANISH

(See Romance Languages)

ZOOLOGY AND ENTOMOLOGY

(Biological Hall, Rooms 3, 4, 7, 8, 9 and Third Floor)

PROFESSOR OSBORN, ASSISTANT PROFESSOR HINE, ASSISTANT PROFESSOR LANDACRE.

1. **Comparative Zoology.** Three times a week, three terms.
2. **Comparative Anatomy of Vertebrates.** Three or five times a week three terms.
12. **Gross Anatomy of the Frog.** Three or five times a week, first term.
13. **Minute Anatomy of the Frog.** Three or five times a week, second term.
14. **Embryology of the Frog.** Three or five times a week, third term.
15. **Invertebrate Morphology.** I. Three or five times a week, first term.
16. **Invertebrate Morphology.** II. Three or five times a week, second term.
17. **Invertebrate Morphology III.** Three or five times a week, third term.
18. **Invertebrate Embryology.** Three or five times a week, three terms.
19. **Vertebrate Embryology: Karyokinesis, etc.** Three or five times a week, first term.
20. **Vertebrate Embryology: Chick and Mammal.** Three or five times a week, second and third terms.
21. **Comparative Neurology.** Three or five times a week, three terms.
22. **Cytology.** Three or five times a week, three terms.
23. **Entomology.** Three or five times a week, three terms.
24. **Ornithology.** Twice a week, three terms.

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UNIVERSITY BULLETIN SERIES 6 — NO. 12

CATALOGUE

OF THE

COLLEGE OF ENGINEERING

OHIO STATE UNIVERSITY

1901—1902

Entered at the Postoffice at Columbus, Ohio, as second-class matter

OHIO STATE UNIVERSITY

CATALOGUE

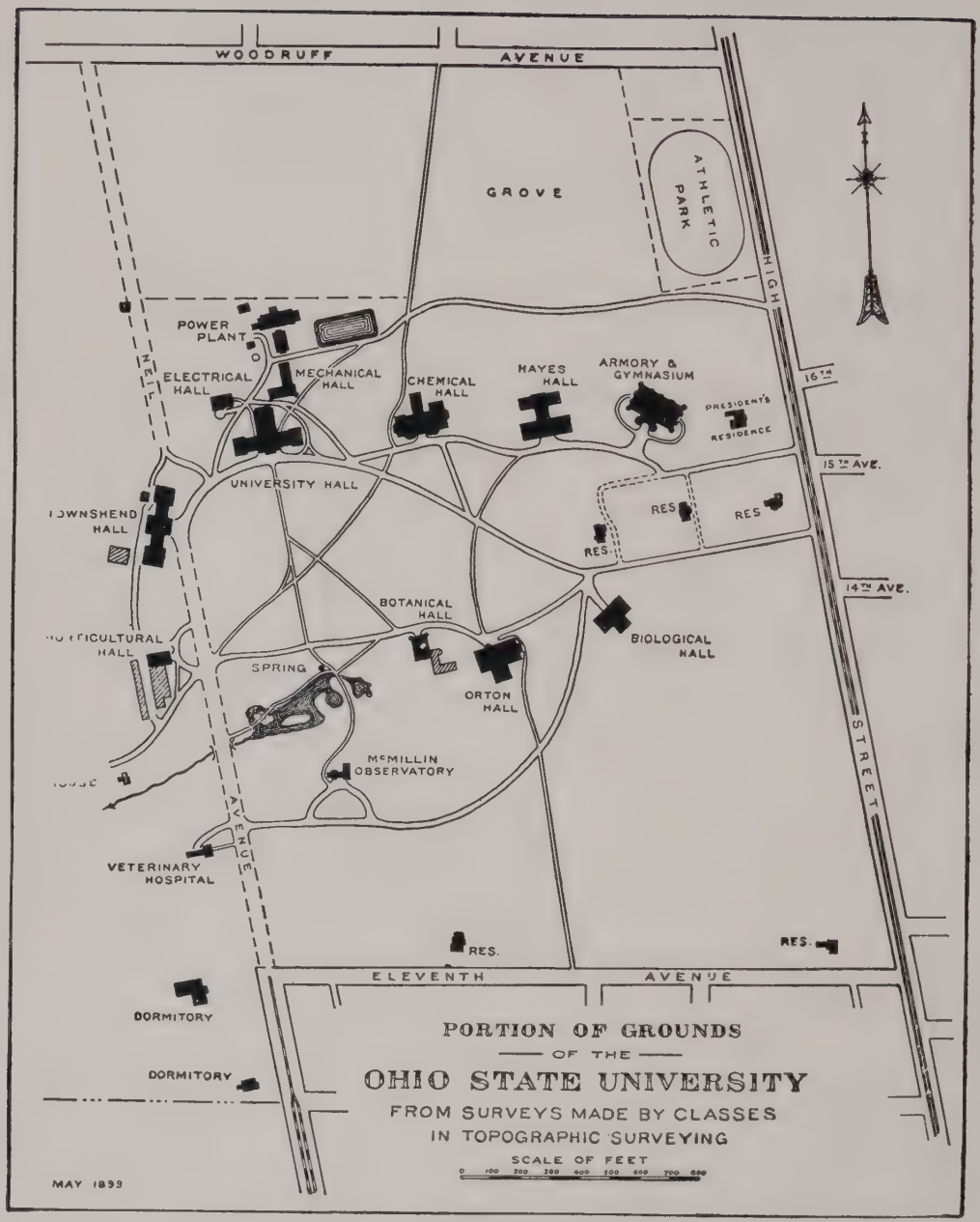
OF THE

COLLEGE OF ENGINEERING

COURSES OF INSTRUCTION
BUILDINGS
EQUIPMENT
FACULTY
ALUMNI
STUDENTS

1901—1902

COLUMBUS
PUBLISHED BY THE UNIVERSITY
APRIL, 1901


WOODRUFF AVENUE
GROVE
ATHLETIC PARK
HIGH STREET
POWER PLANT
ELECTRICAL HALL
MECHANICAL HALL
CHEMICAL HALL
HAYES HALL
ARMORY & GYMNASIUM
PRESIDENT'S RESIDENCE
16TH
15TH AVE.
14TH AVE.
UNIVERSITY HALL
TOWNSHEND HALL
RES.
RES.
RES.
BOTANICAL HALL
BIOLOGICAL HALL
SPRING
ORTON HALL
McMILLIN OBSERVATORY
VETERINARY HOSPITAL
RES.
RES.
ELEVENTH AVENUE
DORMITORY
DORMITORY
PORTION OF GROUNDS
OF THE
OHIO STATE UNIVERSITY
FROM SURVEYS MADE BY CLASSES
IN TOPOGRAPHIC SURVEYING
SCALE OF FEET
0 100 200 300 400 500 600 700 800
MAY 1899

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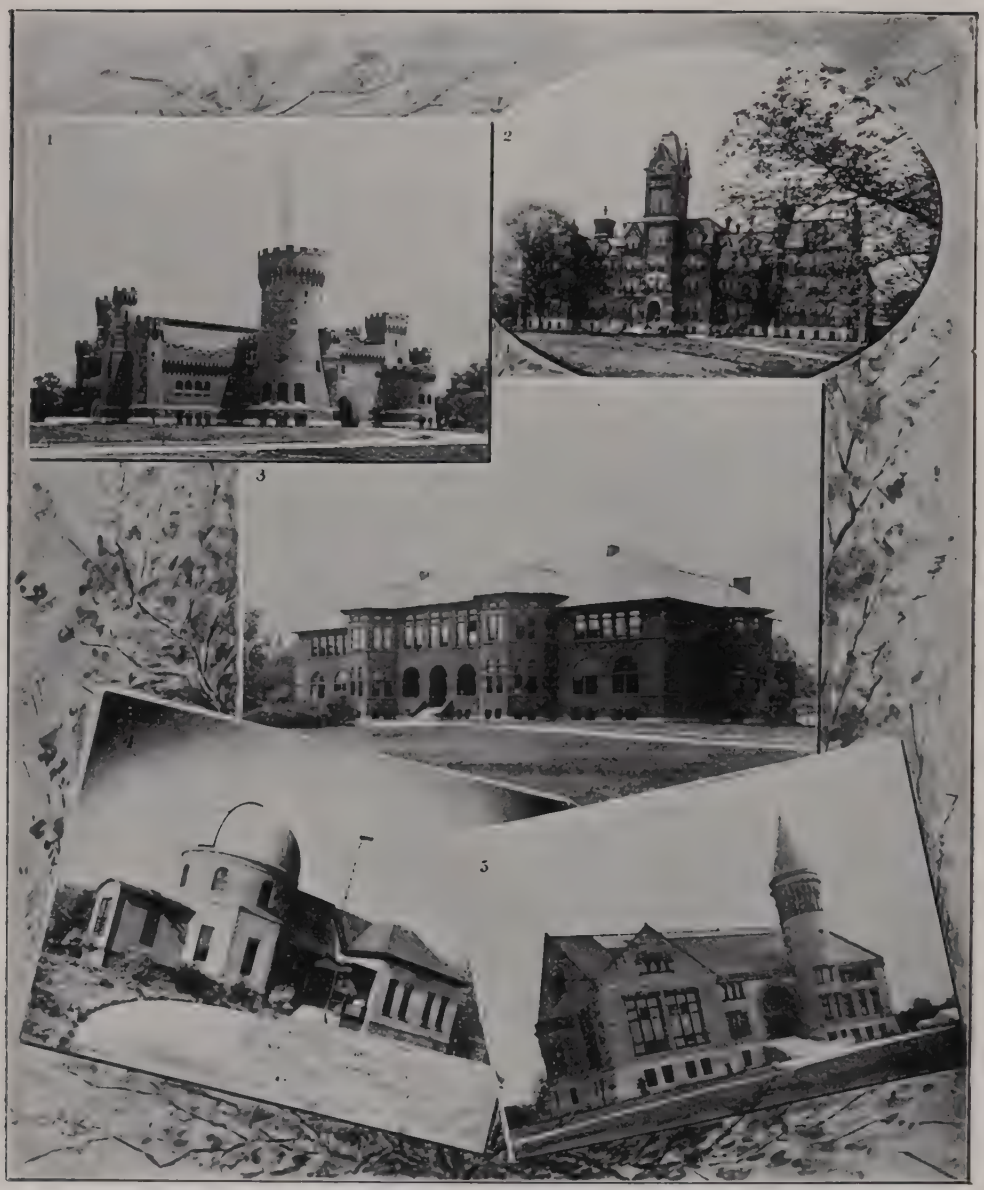


1 — ARMORY AND GYMNASIUM
2 — UNIVERSITY HALL
3 — CHEMICAL HALL
EMERSON McMILLIN OBSERVATORY
5 — ORTON HALL

The Ohio State University

Under an act of Congress passed July 2, 1862, the State of Ohio received from the United States a large grant of the public lands for the purpose of establishing a "college where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such a manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." In accordance with this act, the Ohio State University was founded by the State as a public institution of learning. The governing body of the institution is a Board of Trustees, appointed by the Governor of the State for terms of seven years, as provided in the law organizing the University. The original endowment has been supplemented, and the objects of the University promoted, by a permanent annual grant from the United States, under an act of 1890, by special appropriations of the General Assembly; and in 1891, by a permanent annual grant from the State, which grant was doubled by the Legislature of 1896. Through the aid which has been received from the United States and from the State it is enabled to offer its privileges, with a slight charge for incidental expenses, to all persons of either sex who are qualified for admission.

The University is divided into six colleges as follows:

The College of Agriculture and Domestic Science.
The College of Arts, Philosophy and Science.
The College of Engineering.
The College of Law.
The College of Pharmacy.
The College of Veterinary Medicine.

Each of the above named colleges is under the direction of its own Faculty, which has power to act in all matters pertaining to the work of the students of that particular college. The aim of the University is to give to the young men and women of Ohio the largest possible opportunity for both general and special training, in order to prepare them for the various duties of life.

The University is situated within the corporate limits of the city of Columbus, two miles north of the Union Depot and about

three miles from the State Capitol. The University grounds consist of three hundred and thirty acres. The western portion, about two hundred acres, is devoted to agriculture and horticultural purposes, and is under the management of the College of Agriculture and Domestic Science. The eastern portion is occupied by the principal University buildings, eleven in number, the campus, athletic and drill grounds, a park-like meadow, and a few acres of primitive forest.

The College of Engineering

Since the inception of the University, the College of Engineering has manifested a vigorous and steady growth. To a large extent this growth represents the demand of the people from whom the University derives its support, for it has been the constant policy of the University to enlarge and foster each branch of educational work in response to every intelligent demand.

Yet it is true that the State has advanced and shaped public opinion by providing educational facilities somewhat in advance of public demand. Through its University it has established and built up a system of technical education which is more important than any other single agency in the development of the commercial and industrial interests of Ohio. The marvelous industrial progress made in this State and country in recent years is the best indication of the benefits which have already begun to accrue from the enlargement of technical training, and from its constant subdivision and expansion.

At present the College offers instruction in nine important fields of Engineering work. Covering these, the following four year courses of study are given:

1. *Architecture,* leading to the degree of Civil Engineer in Architecture (C. E. in Arch.). Established in 1900.
2. *Ceramics,* leading to the degree of Engineer of Mines in Ceramics (E. M. in Cer.). Established in 1896.
3. *Chemistry,* leading to the degree of Bachelor of Science in Chemistry (B. Sc.). Established in 1897.
4. *Civil Engineering,* leading to the degree of Civil Engineer (C. E.). Established in 1873.

5. *Electrical Engineering,* leading to the degree of Mechanical Engineer in Electrical Engineering (M. E. in E. E.). Established in 1889.

6. *Industrial Arts,* leading to the degree of Bachelor of Science in Industrial Arts (B Sc.). Established in 1893.

7. *Manual Training,* leading to the degree of Bachelor of Science in Industrial Arts (B Sc.). Established in 1893.

8. *Mechanical Engineering,* leading to the degree of Mechanical Engineer (M. E.). Established in 1879.

9. *Mining Engineering,* leading to the degree of Engineer of Mines (E. M.). Established in 1878.

The following short courses do not lead to degrees, but students completing them are furnished with formal certificates setting forth the work they have accomplished:

10. *Clay-working,* two years. Established in 1894.

11. *Industrial Arts and Shopwork,* two years, Established in 1896.

12. *Mining,* two years. Established in 1887.

The instruction necessary to the completion of these various courses of study is given in twenty-three different departments, under eighty-three professors and assistants. In addition, in some of the courses in this College elective work is offered, which may be taken from any of the thirty-seven departments of the University.

The various departments of the College of Engineering, or shared by this College, occupy about two-thirds of Chemical Hall, nearly the whole of Hayes Hall, the whole of the Mechanical and Electrical buildings, portions of Orton Hall and of the main University building. The equipment for teaching technical and scientific subjects is, in the main, excellent, and in some departments is exceptional. In all departments the annual increase in apparatus and facilities is rapidly making the equipment more perfect and complete.

The Library of the University, consisting of about 40,000 volumes and 10,000 unbound publications, is able to fill the demands of the Engineering students for the most important treatises in their respective fields of science.

DAYS AND DATES

1901

Entrance Examination (8 A. M.)	Monday,	September 16.
First Term begins — Registration Day	Tuesday,	September 17.
Lectures and Class-work begin	Wednesday,	September 18.
President's Address	Friday,	September 20.
Meeting of Trustees	Wednesday,	September 25.
Thanksgiving Recess	Thursday,	November 28.
	Friday,	November 29.
Latest Date for Filing Thesis Subjects	Saturday,	December 14.
First Term ends	Wednesday,	December 18.

Christmas Vacation.

1902

Second Term begins — Registration Day	Wednesday,	January 2.
University Day	Saturday,	February 22.
Second Term ends	Friday,	April 4.

Spring Recess.

Third Term begins — Registration Day	Wednesday,	April 9.
Meeting of Trustees	Wednesday,	April 9.
Field Day — Athletic Association	Saturday,	May 17.
Senior Vacation begins	Saturday,	May 24.
Competitive Drill, Cadet Battalion	Saturday,	May 24.
Memorial Day	Friday,	May 30.
Latest Date for presenting Thesis	Saturday,	June 7.
Final Examinations	Monday to	June 9.
	Friday,	June 13.
Latest Date for filing Bound Copy of Thesis	Friday,	June 13.
Baccalaureate Sermon	Sunday,	June 15.
Entrance Examinations (8 A. M.)	Monday,	June 16.
	Tuesday,	June 17.
Class Day	Monday,	June 16.
Meeting of Trustees	Tuesday,	June 17.
Alumni Day	Tuesday,	June 17.
COMMENCEMENT	Wednesday,	June 18.

Summer Vacation.

Entrance Examination (8 A. M.)	Monday,	September 22.
First Term begins — Registration Day	Tuesday,	September 23.
Lectures and Class-work begin	Wednesday,	September 24.
Annual Address by the President (11 A. M.)	Friday,	September 26.

1 — MECHANICAL HALL
2 — HAYES HALL
3 — ELECTRICAL BUILDING

Corps of Instruction

REV. WILLIAM OXLEY THOMPSON, D. D., LL. D.....University Grounds
President of the University.

NATHANIEL WRIGHT LORD, E. M., DEAN.....338 West Eighth Avenue
Professor of Metallurgy and Mineralogy and Director of the School of Mines.

SIDNEY AUGUSTUS NORTON, PH. D., LL. D.....363 East Town Street
Emeritus Professor and Lecturer in General Chemistry.

STILLMAN W. ROBINSON, C. E., D. Sc.....1353 Highland Street
Emeritus Professor of Mechanical Engineering.

BENJAMIN FRANKLIN THOMAS, PH. D.....University Grounds
Professor of Physics.

GEORGE WELLS KNIGHT, PH. D.....University Grounds
Professor of American History and Political Science.

ROSSER DANIEL BOHANNAN, B. Sc., C. E., E. M..16th and Indianola Avenues
Professor of Mathematics.

C. NEWTON BROWN, C. E.....1343 Forsythe Avenue
Professor of Civil Engineering.

ERNST AUGUST EGGERS.....190 West Eleventh Avenue
Professor of the Germanic Languages and Literatures.

ALBERT MARTIN BLEILE, M. D.....218 King Avenue
Professor of Anatomy and Physiology.

WILLIAM ASHBROOK KELLERMAN, PH. D.....175 West Eleventh Avenue
Professor of Botany.

BENJAMIN LESTER BOWEN, PH. D.....775 E. Broad Street
Professor of the Romance Languages and Literatures.

JOSEPH VILLIERS DENNEY, B. A.....230 West Tenth Avenue
Professor of Rhetoric and the English Language.

EDWARD ORTON, JR., E. M., SECRETARY.....The Normandie
Professor and Director of the Department of Clayworking and Ceramics.

WILLIAM T. MAGRUDER, M. E.....191 King Avenue
Professor of Mechanical Engineering.

J. P. GORDY, PH. D., LL. D.....350 West Seventh Avenue
Professor of Education.

WILLIAM McPHERSON, JR., D. Sc., PH. D.....65 Hamilton Avenue
Professor of Chemistry.

JOSEPH NELSON BRADFORD, M. E.....54 West Tenth Avenue
Professor of Drawing.

CLARENCE P. LINHART, M. D.....The Vendome
Professor of Physical Education and Director of the Gymnasium.

HENRY CURWEN LORD, B. Sc.....University Grounds
Professor of Astronomy and Director of the Emerson McMillin Observatory.

FREDERICK CONVERSE CLARK, PH. D.....1634 Neil Avenue
Professor of Economics and Sociology.

FRANK EDWIN SANBORN, S. B.....303 West Eighth Avenue
Professor and Director of the Department of Industrial Arts.

FRANK ARNOLD RAY, E. M.....137 King Avenue
Professor of Mine Engineering.

GEORGE L. CONVERSE, CAPTAIN U. S. A. (Retired).....398 Oak Street
Professor of Military Science and Tactics.

EMBURY ASBURY HITCHCOCK, M. E.....380 West Eighth Avenue
Professor of Experimental Engineering.

FRANCIS CARY CALDWELL, B. A., M. E.....401 West Sixth Avenue
Professor of Electrical Engineering.

CHARLES SMITH PROSSER, M. S.....1362 Highland Street
Professor of Geology.

JOHN ADAMS BOWNOCKER, D. Sc.....1594 Neil Avenue
Professor of Inorganic Geology and Curator of the Museum.

OLIVE B. JONES.....53 Eleventh Avenue
Librarian.

GEORGE WASHINGTON McCOARD, M. A.....325 West Sixth Avenue
Associate Professor of Mathematics.

CHARLES WALTER MESLOH, M. A.....1627 North High Street
Associate Professor of the Germanic Languages and Literatures.

JAMES ELSWORTH BOYD, M. Sc.....25 Maynard Avenue
Associate Professor of Mathematics.

CHRISTOPHER ELIAS SHERMAN, C. E.....772 Oak Street
Associate Professor of Civil Engineering.

CHARLES A. BRUCE, B. A.....234 West Tenth Avenue
Associate Professor of the Romance Languages and Literatures.

WILLIAM EDWARD HENDERSON, PH. D.....41 West Eleventh Avenue
Associate Professor of Chemistry.

WILLIAM LUCIUS GRAVES, M. A.....1313 Forsythe Avenue
Assistant Professor of Rhetoric.

THOMAS EWING FRENCH, M. E.....1458 Worthington Street
Assistant Professor of Drawing.

*CHARLES WILLIAM FOULK, B. A.....Leipzig, Germany
Assistant Professor of Analytical Chemistry.

* Absent on leave, for 1900–1901.

CHARLES LINCOLN ARNOLD, M. Sc.....328 West Eighth Avenue
Assistant Professor of Mathematics.

JOHN H. SCHAFFNER, B. A., M. S.....61 West Eleventh Avenue
Assistant Professor of Botany.

CHARLES BRADFIELD MORREY, B. A., M. D.....86 King Avenue
Assistant Professor of Anatomy and Physiology.

KARL DALE SWARTZEL, B. Sc.....57 East Eighth Avenue
Assistant Professor of Mathematics.

GEORGE H. McKNIGHT, PH. D.....312 West Seventh Avenue
Assistant Professor of Rhetoric and the English Language.

HERRICK CLEVELAND ALLEN, LL. B.....275 East Gay Street
Assistant Professor of Rhetoric and the English Language.

WILLIAM ABNER KNIGHT, M. E.....206 West Lane Avenue
Assistant Professor of Machine-Shop Practice.

*FREDERICK ALAN FISH.....
Assistant Professor of Electrical Engineering.

FREDERICK KESTER, M. E. in E. E.....1473 Neil Avenue
Instructor in Physics.

ALONZO HUBERT TUTTLE, B. A.....215 West Tenth Avenue
Instructor in American History and Political Science.

WILLIAM HENRY RENCK.....910 West Rich Street
Instructor in Pattern-Making and Founding.

CHARLES PHILIP CROWE.....971 Highland Street
Instructor in Forging.

THOMAS KENYON LEWIS, B. Sc.....1293 Dennison Avenue
Instructor in Drawing.

EDWARD EVERETT SOMERMEIER, G. PH.....1590 Neil Avenue
Instructor in Metallurgy and Mineralogy.

SILAS MARTIN.....1269 Dennison Avenue
Instructor in Drawing.

SAMUEL EUGENE RASOR, B. Sc.....1594 Neil Avenue
Instructor in Mathematics.

*ALBERT VICTOR BLEININGER.....
Instructor in Ceramics.

*JOSEPH HENRY VOSSKUEHLER.....
Instructor in Drawing.

*BERTHOLD AUGUST EISENLOHR.....
Instructor in German.

J. WARREN SMITH.....55 Cleveland Avenue
Lecturer on Meteorology.

* Appointment takes effect July 1st, 1901.

DON CARLOS HUDDLESON, G. PH.....249 West Lane Avenue
Assistant in Gymnasium.

FRANCIS MARTIN HAMILTON, B. A.....1355 North High Street
Assistant in Philosophy and Education.

MELVIN DRESBACH, B. Sc., M. Sc.....236 West Eighth Avenue
Assistant in Anatomy and Physiology.

FREDERICK JARED TYLER, B. Sc.....43 East Ninth Avenue
Assistant in Botany.

WILLIAM LLEWELLYN DAVIES.....212 West Tenth Avenue
Assistant in Civil Engineering.

SAMUEL VERNON PEPPEL, B. Sc.....169 West King Avenue
Assistant in Ceramics.

SAMUEL SUMNER EDMANDS, B. S.....237 West Eleventh Avenue
Assistant in Electrical Engineering.

EDGAR HOWARD MOORE, B. Sc.....475 West Fourth Avenue
Assistant in German

SARAH BARROWS.....85 West Tenth Avenue
Assistant in German.

HERBERT CHARLES GORE, B. Sc.....185 West Ninth Avenue
Assistant in Chemistry.

RICHARD T. JONES, B. PH.....172 North Seventeenth Street
Assistant in Romance Languages.

DANFORTH E. BALL.....565 East Broad Street
Emerson McMillin Fellow in Astronomy.

CHARLES BOYD SAYRE, B. A.....716 Neil Avenue
Fellow in American History and Political Science.

GEORGE WINFIELD FROST, M. E.....1018 Neil Avenue
Fellow in Mechanical Engineering.

NILE OTIS FORD.....61 West Eleventh Avenue
Fellow in Metallurgy and Mining.

HERBERT B. BROOKS.....477 West Seventh Avenue
Fellow in Physics.

HARRIET GRISWOLD BURR, B. A.....1454 Highland Street
Fellow in Botany.

WILLIAM EDWARD BOHN, B. A., M. A.....43 West Eighth Avenue
Fellow in Rhetoric.

WALTER FISCHER, B. Sc.....810 Franklin Avenue
Fellow in Botany.

ROYAL ALBERT ABBOT, B. PH.....1364 Forsythe Avenue
Fellow in Rhetoric.

CLARENCE PHILANDER LINVILLE, B. Sc.....61 West Eighth Avenue
Fellow in Chemistry.

WILBUR LATIMER DUBOIS, B. Sc.....61 West Eighth Avenue
Fellow in Chemistry.

CHARLES HUBBELL KIMBERLY, B. Sc.....1300 Neil Avenue
Fellow in Chemistry.

SELDEN F. SMYSER, PH. B.....1451 Worthington Street
Fellow in Economics.

MARY W. RICE, B. A.....844 Summit Street
Emerson McMillin Fellow in Economics.

JOHN FRANCIS TRAVIS, B. A.....239 West Tenth Avenue
Fellow in Mathematics.

.....
Fellow in Electrical Engineering.

HARRY HANCE.....1093 East Long Street
Student Assistant in Chemistry.

WILLIAM EDGAR DAVIS.....199 West Eleventh Avenue
Student Assistant in Mathematics.

CLARENCE L. E. MOORE.....68 West Tenth Avenue
Student Assistant in Mathematics.

JOHN C. CHAMBERLIN.....212 West Tenth Avenue
Student Assistant in Drawing.

ALBERT FREEMAN HALL.....1051 Highland Street
Machinist, Department of Mechanical Engineering.

JOHN PATTERSON COVAN.....500 West Sixth Avenue
Machinist, Department of Electrical Engineering.

Courses of Study

All engineering education is based on the constant use of the fundamental sciences, mathematics, physics and chemistry, supplemented by training in the art of expression, both by language and by drawing. It naturally follows therefore that all engineering courses start from a common point, proceed side by side for a time, but specialize and subdivide more and more as they progress toward completion, until in the last year they present but little work in common.

Further, it is very commonly the case with young men entering college for a technical education, that they are following ambitions not founded on any knowledge of their own natural aptitudes or capacities, and that they are in no way prepared to make a wise or final selection of their life work at that time.

For the two foregoing reasons, tne first years of each of the engineering courses leading to a degree, are made identical throughout. The student is enrolled as a "First-year Engineer." His selection of the course he wishes to pursue is deferred to the opening of his second year, by which time he has become acquainted to some extent with University standards and methods, with the scope of the various courses offered, and with his own tastes and powers.

FIRST YEAR

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Mathematics (14) Plane Analytics.	5.	Mathematics (15,16) Trigonom. and Algebra.	5.	Mathematics (17) Plane Analytics.	5.
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Chemistry (12) Qualitative Analysis.	4.
Modern Language French, Ger. or Spanish.	4.	Modern Language French, Ger. or Spanish.	4.	Modern Language French, Ger. or Spanish.	4.
Rhetoric (1) and (21) Composition.	2½.	Rhetoric (1) & (21) Composition.	2½.	Rhetoric (1) and (21) Composition.	2½.
Drawing (1) Freehand.	2.	Drawing (1) Freehand.	2.	Drawing (2) Lettering.	3.
Drill and Gymnasium.		Drill and Gymnasium.		Drill.	

Military Drill is required of able-bodied male students, four hours per week up to the first of December. From that time till April first, two hours of drill are replaced by two hours per week of Gymnasium work, under supervision of the Director of Physical Training. After April first, four hours per week of drill are again required. In cases of physical disability, prescription work in the Gymnasium takes the place of drill.

COURSE IN ARCHITECTURE

This course is designed to produce men who unite a thorough knowledge of those phases of engineering which deal with the materials and methods of architectural construction, and a special training in appropriate and harmonious use of form, color, and decorative design.

Recent years have developed types of buildings without precedent in the history of architecture, in which the amount of unencumbered, internal space obtained is as remarkable as the safety, durability, comfort and healthfulness of the buildings themselves. The ends obtained in the modern, tall, steel-skeleton building would have been utterly impossible in the solid masonry structures of the past.

Mathematics, the foundation for the solution of constructive problems, is studied for two years, and in the technical work of the course its use is constant.

Drawing is an important factor in the education of the architect, and includes that of the engineer and of the artist, being controlled partly by considerations of fact and partly by those of appearance. It extends in some form throughout the course, including freehand, mechanical, descriptive geometry, shades and shadows, perspective, pen drawing, brush-drawing in color, clay-modeling; and is applied in the architectural designing.

The engineering technical work includes: strength of material, testing materials, stresses in trusses and framed structures, masonry, mortars, electricity and surveying.

The rapidly increasing application of electricity in modern buildings requires architects and superintendents of buildings to know the fundamentals of electric construction and, at least, the common sources of danger in its use. To meet this need the course in physics is supplemented with two terms of electrical engineering. For similar purposes in the safe installation of water and steam piping, elevators, and power, a laboratory course in experimental mechanical engineering succeeds the regular course in mechanics and strength of materials.

The history of architecture, necessary to broaden the student's architectural knowledge, is given a prominent place, and is freely illustrated by a selected set of lantern slides.

Decoration and ornament comprise a study of the decorative details of the different styles of architecture, both in carved ornament and decorative color.

The technical architecture includes: designing architectural structures complete, specifications, heating, ventilating, plumbing, estimates, fire-proofing, superintendence and contracts.

See also pages 39–40.

COURSE IN ARCHITECTURE

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

Second Year

FIRST TERM.	Credit hours	SECOND TERM.	Credit hours	THIRD TERM.	Credit hours
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	5.	Drawing (3) Shades, Shadows.	5.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics, Heat.	3.	Physics (2) Elect'y, Magnetism.	3.	Physics (2) Light, Sound.	3.
Architecture (9) Hist'y of Architecture.	3.	Architecture (10) Hist'y of Architecture.	3.	Architecture (11) Hist'y of Architecture.	3.
Architecture (12) Detail Drawing.	2.	Architecture (13) Detail Drawing.	2.	Architecture (14) Detail Drawing.	2.
Drawing (14) Pen Drawing.	2.				
Military Drill.		Drill and Gymnasium.		Military Drill.	

Third Year

Mech. Eng'ring (6) Mechanics.	5.	Mech. Eng. (6) Mechanics.	5.	Mech. Eng. (7) Strength Materials.	5.
Architecture (15) Designing.	4.	Architecture (16) Designing.	2.	Architecture (17) Designing.	4.
Drawing (7) Photography.	2.	Drawing (12) Clay Modeling.	2.	Drawing (12) Clay Modeling.	2.
Elec. Eng'ring (6) Lectures.	2.	Elec. Eng. (6 & 7) Lectures and Lab.	4.		
Architecture (5) Decorations, etc.	3.	Civil Eng. (6) Stereotomy.	4.	Civil Eng. (19) Trusses.	5.
Rhetoric (2)	2.	Rhetoric (3)	2.	Rhetoric (3)	2.

Fourth Year

Architecture (18) Designing.	4.	Architecture (4) Specifications.	2.	Architecture (6) Estimates and Supt.	4.
Civil Eng. (15) Masonry.	5.	Architecture (7) Heating, Vent., etc.	5.	Architecture (19) Designing.	4.
Mech. Eng. (23) Materials of Const.	4.	Architecture (8) Designing.	5.	Architecture (20) Thesis.	5.
Geology (2) General.	5.	Geology (6) Economic.	3.	Civil Eng. (21) Surveying.	3.
		Drawing (18) Color work.	3.	Drawing (19) Color work.	2.

THESIS

COURSE IN CERAMICS

The ceramic industries include, according to the classification here adopted, those industries in which the production and utilization of natural and artificial silicates is the end in view, viz., clayware, glass and cement. These three industries constitute a natural division of chemical technology, and though they are intimately connected with the field of the metallurgist on the one hand, and with the manufacturing chemist on the other, still they have an individuality which makes their study and exploitation as a separate field of industrial science advisable.

The work which the ceramic engineer must be prepared to supervise is broad and varied. In the preparation of any product of uniform physical and chemical qualities from the crude rocks and minerals of the earth's surface, a knowledge of chemistry is the foremost essential, and no one without the training of the chemical laboratory, in which an account must be rendered for everything, can hope to attain the highest mastery in this subject. In this course, therefore, chemistry forms an important part of the training, beginning with the first term and continuing through three years of purely chemical work, followed by a year of practice in the application of chemistry to ceramic operations.

But the ceramic engineer will be subjected to other calls on his resources. He must be able to intelligently search for and locate deposits of the crude mineral supplies which he needs, and having found them, he must be able to win them safely and economically, whether on the surface or under ground in mines. To this end, the student is given training in mineralogy, geology, both historic and economic, metallurgy, so far as it pertains to fuels and iron, and mine engineering.

Also, like the metallurgist, the ceramist deals with reagents and performs chemical reactions on a gigantic scale; and in the winning of the materials, their mechanical preparation, their economic handling and storage, their manufacture into useful forms, and in the construction of buildings, machinery, kilns and furnaces for these purposes, the knowledge and resources of the trained engineer must constantly re-enforce those of the chemist and geologist. Accordingly the course includes a vigorous drill in mathematics, physics, mechanics, strength of materials, drawing, drafting, shopwork and construction. In addition, at least one year of some modern language, preferably German, and two years in the correct use of the English language are required.

See also pages 44–48.

COURSE IN CERAMICS

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

Second Year

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	3.	Drawing (3) Shades, Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics, Heat.	3.	Physics (2) Elect'y, Magnetism.	3.	Physics (2) Light, Sound.	3.
Physics (3) Problems.	2.	Physics (3) Problems.	2.	Physics (3) Problems.	2.
Ceramics (1) Laboratory.	5.	Ceramics (2) Laboratory.	5.	Ceramics (3) Laboratory.	5.
Military Drill.		Drill and Gymnasium.		Military Drill.	

Third Year

Mech. Eng. (6) Mechanics.	5.	Mech. Eng. (6) Mechanics.	5.	Mech. Eng. (7) Strength Materials.	5.
Ceramics (4) General Principles.	5.	Ceramics (5) Bricks.	5.	Ceramics (6) Pottery.	5.
Mine Eng. (4) Mine Surveying.	5.	Ceramics (7) Adv. Chem. Lab.	5.	Metallurgy (2) Mineralogy.	3.
Rhetoric (2) Expository Writing.	2.	Rhetoric (3) Brief-Making.	2.	Rhetoric (3) Brief-Making.	2.
				Shopwork (11) Forging.	3.

Fourth Year

Ceramics (9) Manf. of Bodies.	5.	Ceramics (10) Glasses and Glazes.	5.	Ceramics (11) Enamels, Colors.	5.
Metallurgy (4) Fuels and Iron.	5.	Ceramics (12) Cement.	5.	Ceramics (15) Thesis Work.	5.
Shopwork (4) Chipping and Filing.	3.	Ceramics (17) Ceramic Const.	4.	Mech. Eng. (25) Laboratory.	5.
Geology (2) General.	5.	Geology (6) Economic.	3.	Drawing (7) Photography.	2.

THESIS

COURSE IN CHEMISTRY

This course has been prepared to meet the growing demand for trained men in the numerous manufacturing industries which are based upon chemical processes or employ them prominently in their work, and which are not included in the fields of metallurgy and ceramics. Among such may be mentioned the manufacture of acids, alkalies, salts, chemical reagents, paints, colors, dyes, bleaching powders, soaps, glue, gelatine, glycerine, tanning compounds, starch, sugar, dextrine and glucose, alcohol, ferments, preservatives, antiseptics, fertilizers, pyrotechnics, matches and many others.

In order to meet the demands of such widely diversified industries, it is necessary that the training offered shall be somewhat elastic and permit the student to specialize somewhat in advance of his graduation.

The work of the course is therefore partly required and partly elective.

The compulsory work is planned to meet two requirements: 1st, a thorough knowledge and grasp of the science of chemistry; and 2d, sufficient general training in engineering to enable the student to plan the execution of chemical work on a large scale, and with the mechanical aids necessary to commercial success.

The student begins his chemical work in the first year with general inorganic chemistry, followed by qualitative and quantitative analysis, metallurgical analysis, organic chemistry, inorganic preparations or the elements of manufacturing chemistry, sanitary analysis, advanced theoretical chemistry and a course of lectures on general applied chemistry, including a term each in the elements of metallurgy and ceramics.

In the engineering side, the requirements include mathematics, physics, drawing and shopwork. Besides the usual training in English, German is also compulsory on account of the large amount of chemical literature printed only in this language.

In the elective work opportunity is given to the student, under supervision of the head of the department, to frame his course according to the ultimate use to which he intends to put it. These electives begin in the second year and increase in amount as the student becomes more mature and better able to guage his purposes and abilities. In ordinary cases, where the student is fitting himself for some branch of chemical technology, he should elect further work in engineering, such as advanced mathematics, drafting, mechanics, strength of materials, machine design, thermo-dynamics, steam engineering, or applied electricity.

See also pages 49–51.

COURSE IN CHEMISTRY

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

Second Year

FIRST TERM.	Credit hours	SECOND TERM.	Credit hours	THIRD TERM.	Credit hours
Chemistry (20) Quantitative.	4.	Chemistry (20) Quantitative.	4.	Chemistry (20) Quantitative.	4.
Chemistry (21) Physical Chemistry.	2.	Chemistry (21) Physical Chemistry.	2.	Chemistry (21) Physical Chemistry.	2.
Physics (2) Mechanics, Heat.	3.	Physics (2) Elect'y, Magnetism.	3.	Physics (2) Light, Sound.	3.
Shopwork (7) Woodwork.	3.	Shopwork (11) Forging.	3.	Metallurgy (2) Mineralogy.	3.
German (1 or 5)	4.	German (1 or 5)	4.	German (1 or 5)	4.
Military Drill.		Drill and Gymnasium.		Military Drill.	

Two full years of German are required of all students graduating in the chemical course. Those who arrive at the beginning of their second year without having begun it, must commence then, and must continue it in the place of work otherwise elective until the specified amount is completed. Those who enter with credit for Elementary German, and pursue advanced German in their first year, may elect other work in the second year.

In addition, two to three hours of electives are required throughout the year. The following are suggested: Mathematics, Drawing, Agricultural Chemistry, Physiology, History, Economics.

Third Year

Chemistry (8) Organic.	5.	Chemistry (9) Organic.	5.	Chemistry (9) Organic.	5.
Metallurgy (5) Laboratory.	5.	Metallurgy (6) Assaying.	5.	Metallurgy (5) Laboratory.	5.
Rhetoric (2) Expository Writing.	2.	Rhetoric (3) Brief-Making, etc.	2.	Rhetoric (3) Brief-Making, etc.	2.

Electives five to eight hours throughout the year.

The following are suggested: Physical Laboratory, 3 to 5 hours; Geology, 5 hours — or Geology and Determinative Mineralogy, 5 hours; Shopwork, 3 hours; Agricultural Chemistry.

Fourth Year

Chemistry (17) Inorganic Prep.	4.	Chemistry (16) General.	3.	Chemistry (15) Sanitary.	4.
Metallurgy (4) Fuels and Iron.	5.	Metallurgy (4) Applied.	5.	Ceramics (16) Gen'l Principles.	3.
		Physiology (8) Bacteriology.	2.		

Electives to make the total work equal sixteen or eighteen hours, including Thesis work.

Students may take Metallurgy 5 and 3 in place of Chemistry 16 and 15 and Physiology 8. Such students will take ore dressing in the first term.

THESIS

COURSE IN CIVIL ENGINEERING

The field of the civil engineer comprises mensuration or surveying and also construction in its broad sense.

While many of its departments have grown into distinct professions, civil engineering, the parent stem, remains with more and larger opportunities than ever before.

As all the problems of the engineer involve the principles of the sciences, these form the ground-work of the course, and while mathematics is the foundation, occupying three years either alone or in its applications, physics, chemistry, geology and astronomy are each given an important place.

The technical work embraces instruction in free hand and mechanical drawing, surveying and map-making, steel bridges and buildings, masonry structures, roads, streets, railways, water-supply, sanitary engineering, the testing of structural materials, and the fundamentals of steam and electrical machinery.

The drawing extends practically through the entire four years. It is designed to fit men to take responsible positions as draftsmen.

The work in surveying includes three terms' work in the text-book and field work on the campus. At the end of the second year, and again at the end of the third year, the surveying classes are taken into camp in a rough country and devote their entire time to surveying. It is expected to fit young men for at once taking charge of field engineering corps.

Two terms' work is required in steel construction, the first being devoted to the computation of stress, and the second to the designing, detailing and drawing of roofs, bridges, buildings and other framed structures. The practice of the best bridge shops is followed. The term's work in masonry structure treats of building materials, abutments and piers, retaining walls, dams and masonry arches. Roads, street and railway construction and maintenance are treated at length in text books and lectures. A term is devoted to each of the subjects of water supply and sanitary engineering.

All through the technical work, frequent references are made to periodicals, transactions of engineering societies and other works on engineering, and the student is required to become familiar with them.

The object sought in all the technical work is to give a thorough training in the theory of the subjects, to show how these are applied in practice and to give as much drill as possible in office and field methods.

See also pages 52–56.

COURSE IN CIVIL ENGINEERING

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

Second Year

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	5.	Drawing (3) Shades, Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics, Heat.	3.	Physics (2) Elect'y. Magnetism.	3.	Physics (2) Light, Sound.	3.
Civil Eng. (1) Land Surveying.	6.	Civil Eng. (4) Topography.	4.	Civil Eng. (2) Railroad Surveying.	6.
Military Drill.		Drill and Gymnasium.		Military Drill.	

SUMMER COURSE

Civil Engineering (22) 4 weeks, of 6 days per week. Field work in land and railroad surveying.

Third Year

Mech. Eng. (6) Mechanics.	5.	Mech. Eng. (6) Mechanics.	5.	Mech. Eng. (7) Strength Materials.	5.
Civil Eng. (3) Topog. Surveying.	4.	Civil Eng. (24) C. E. Drawing.	5.	Civil Eng. (7) Bridge Stresses.	5.
Civil Eng. (16) Roads and Streets.	5.	Civil Eng. (6) Stereotomy.	4.	Drawing (7) Photography.	2.
Astronomy (2) Mathematical.	3.	Astronomy (2) Mathematical.	3.	Astronomy (2) Mathematical.	4.
Rhetoric (2) Expository Writing.	2.	Rhetoric (3) Brief-Making, etc.	2.	Rhetoric (3) Brief-Making, etc.	2.

SUMMER COURSE

Civil Engineering (23) 4 weeks, of 6 days per week. Field work in railroad and topographical surveying.

Fourth Year

Civil Eng. (8) Bridge Designing.	5.	Civil Eng. (17) Railways.	5.	Civil Eng. (18) Water Supply.	5.
Civil Eng. (15) Masonry.	5.	Civil Eng. (14) Cement Testing.	2.	Civil Eng. (10) Sanitary Eng.	5.
Elec. Eng. (6) Lectures.	2.	Elec. Eng. (6 and 7) Lectures and Lab.	4.		
		Mech. Eng. (17) Laboratory.	3.	Mech. Eng. (25) Laboratory.	5.
Geology (2) General.	5.	Geology (6) Economic.	3.		

THESIS

COURSE IN ELECTRICAL ENGINEERING

The object of this course is to give such training as shall enable the graduate to successfully take up practical work in those branches of engineering in which electricity plays the principal part. In general, the training needed for this purpose is the same as that of the Mechanical Engineer, except that the student need have only a general familiarity with other methods of power generation and utilization, and must, of course, make a very thorough study of the subject of electricity. Consequently, the first two years of the two courses are alike, except as regards shopwork and physics.

A considerable part of the first two terms of the third year is occupied by a thorough training in elementary electrical engineering measurement, such as currents, voltage, capacity, inductance, magnetic flux, etc. This work is given in the physical department (see Physics, Course 6, page 88). The third year also includes training in mechanics, mechanism, machine design, and strength of materials, the latter taught both in the class-room and in the laboratory. In the last term the study of steam machinery is commenced. Work on dynamo machinery is begun in the class-room in the second term, and followed up during the third term in the laboratory.

In the last year of the course, engines and boilers are studied during the first term in the class room, and during both the first and second terms in the laboratory. Instruction in electrical engineering forms the main part of the work of this year. It is carried on in the class-room, drawing room, and laboratory, and includes besides a thorough course in alternating current machinery, courses on power transmission and upon the application of electricity. Throughout the whole of this year a part of the work is elective, and is chosen by the student subject to the approval of the head of the department. The end which is kept most in view, is the training of the student to think for himself, and to solve for himself the problems of the engineer.

Work in the class-room is done partly by text book and partly by lecture and recitation, preference being given to the former, where satisfactory books are available. The work is illustrated by the use of the projection lantern, diagrams and illustrative apparatus. Much stress is laid on the solution of numerical problems by the student. In the drawing room, designs are made of dynamo machinery of different kinds, transformers, house wiring, transmission, etc., the work here being as far as practicable based on the theoretical conclusions reached in the class and laboratory. The equipment is good and is increasing.

See also pages 62–66.

COURSE IN ELECTRICAL ENGINEERING

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

Second Year

FIRST TERM.	Credit hours	SECOND TERM.	Credit hours	THIRD TERM.	Credit hours
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	3.	Drawing (3) Shades, Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics, Heat.	3.	Physics (2) Elect'y, Magnetism.	3.	Physics (2) Light, Sound.	3.
Physics (3) Problems.	2.	Physics (3) Problems.	2.	Physics (3) Problems.	2.
Shopwork (11) Forging.	2.			Physics (5) Laboratory.	4.
Rhetoric (2) Expository Writing.	2.	Rhetoric (3) Brief-Making, etc.	2.	Rhetoric (3) Brief-Making.	2.
Shopwork (4) Chipping, Filing.	2.	Shopwork (13) Machine Work.	3.		
Military Drill.		Drill and Gymnasium.		Military Drill.	

Instruction in wood-working is given in this course. It does not appear in this Catalogue, owing to intended rearrangements of the shopwork courses, which will include a summer course of four weeks.

Third Year

Mech. Eng. (6) Mechanics.	5.	Mech. Eng. (6) Mechanics.	5.	Mech. Eng. (7) Strength Materials.	5.
Physics (6) Laboratory.	5.	Physics (6) Laboratory.	5.	Mech. Eng. (32) Power Plants.	5.
Physics (4) Elect'y, Magnetism.	3.	Mech. Eng. (3) Mechanism.	5.	Mech. Eng. (28) Laboratory.	2.
Shopwork (14) Machine Work.	3.	Elec. Eng. (8) D. C. Machinery.	4.	Ind. Arts (7) Mach. Design.	3.
Drawing (5) Technical.	3.			Elec. Eng. (9) Laboratory.	4.

Fourth Year

Elec. Eng. (10) A. C. Machinery.	3.	Elec. Eng. (10) A. C. Machinery.	3.	Elec. Eng. (13) Applications.	5.
Elec. Eng. (11) Laboratory.	3	Elec. Eng. (14) Designing.	4.	Elec. Eng. (14) Designing.	4.
Mech. Eng. (33) Engines and Boilers.	5.	Elec. Eng. (11) Laboratory.	3.	Elec. Eng. (11) Laboratory, Thesis.	5.
Mech. Eng. (29) Laboratory.	3.	Elec. Eng. (12) Transmission.	2.		
		Mech. Eng. (30) Laboratory.	2.		
*Elective	3–5.	*Elective	3–5.	*Elective	3–5.

THESIS

* Subject to the approval of the Professor of Electrical Engineering.

COURSE IN INDUSTRIAL ARTS

This course is designed for those who may desire to occupy positions in the various branches of manufacture, not as engineers, but as practical managers, superintendents or business men.

As the growth of engineering has brought about its subdivision into many special lines such as civil, mechanical, electrical, mining and chemical engineering, and established special training for each, so the increase in size, importance and scope of the manufactures of the country has made it desirable to especially train young men with reference to filling positions of trust and responsibility in them: to so educate them that they can readily learn the treatment or processes in any special line of manufacture and be able to intelligently superintend: and that they can initiate and put into successful operation new industrial enterprises, or extend and improve old ones.

With this idea in view this course has been planned to give the student special training along industrial and business lines, together with a certain amount of general culture. There will be found in the course a large amount of science training by which the processes of manufacture based upon these laws may be more readily understood; practice in the different shops and in drawing so that a good working knowledge of such operations may be acquired as well as training given to eye and hand, and power of observation and thought along mechanical lines developed: studies into the principles and methods governing the production of the chief materials of construction, the different mechanical movements and their combination in machinery, the use of materials in various constructions, electrical machinery and steam power plants, together with laboratory practice: also the relations of capital and labor, the problems of trade, and the conduct of business enterprises.

This course is well adapted to meet the needs of those young men already employed in industrial pursuits at the machine or bench, who are ambitious to advance to positions of greater responsibility and influence. This course offers an excellent opportunity to such men: it gives them four years of earnest work under good instructors to direct and assist personally, and the advantages of laboratory work to supplement the theoretical book-work. Those intending to take this course should first prepare themselves to meet the entrance requirements as given on page 106. Those unable to spend four years in this course will find on page 36 a short course requiring two years.

All choice of electives must be made in consultation with the head of the department and receive his approval.

See also pages 70–72.

COURSE IN INDUSTRIAL ARTS

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

Second Year

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Drawing (2) Projections.	3.	Drawing (3) Descriptive Geom.	3.	Drawing (3) Shades, Shadows.	3.
Physics (2) Mechanics, Heat.	3.	Physics (2) Elect'y, Magnetism.	3.	Physics (2) Light Sound.	3.
Physics (3) Problems.	2.	Physics (3) Problems.	2.	Physics (3) Problems.	2.
Shopwork (7) Woodwork.	3.	Shopwork (9) Adv. Pattern Making.	3.	Shopwork (8) Cabinet Work.	3.
Shopwork (3) Foundry.	3.	Shopwork (11) Forging.	3.	Shopwork (12) Adv. Forging.	3.
Rhetoric (2) Expository Writing.	2.	Rhetoric (3) Brief-Making, etc.	2.	Rhetoric (3) Brief-Making, etc.	2.
Eeconomics (2) Industrial Society.	2.	Economics (3) Indus. and Fin. Hist.	2.	Economics (4) Transportation Problems.	2.
Military Drill.		Drill and Gymnasium.		Military Drill.	

Third Year

Drawing (5) Technical.	3.	Industrial Arts (2) Designing.	3.	Industrial Arts (2) Designings.	3.
Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.
Shopwork (4) Chioping and Filing.	3.	Shopwork (13) Machine Work.	3.	Shopwork (14) Machine Work.	3.
Metallurgy (4) Fuels and Iron.	5.	Metallurgy (4) Steel.	2.	Mech. Eng. (32) Power Plants.	5.
		Mech. Eng. (22) Timber and Masonry.	3.		
Economics (1*a*) Elem. of Polit. Econ.	4.	Economics (1*a*) Elem. of Polit. Econ.	2.		
		History (1*b*) U. S. Political.	2.	History (1*b*) U. S. Political.	4.

Fourth Year

Shopwork (15) Adv. Mach. Work.	3.	Shopwork (16) Adv. Mach. Work.	3.	Shopwork (17) Adv. Mach. Work.	3.
Elect. Eng. (6) Lectures.	2.	Elect. Eng. (6) Lectures.	2.	Civil Eng. (21) Surveying.	3.
Elect. Eng. (7) Laboratory.	2.	Elect. Eng. (7) Laboratory.	2.		
Industrial Arts (3) Shop Equipment.	3.	Industrial Arts (3) Shop Appliances.	3.	Industrial Arts (3) Shop Management.	3.
Industrial Arts (4) Adv. Designing.	3.	Industrial Arts (4) Adv. Designing.	3.	Industrial Arts (4) Adv. Designing.	3.
Mech. Eng. (28) Laboratory.	2.	Mech. Eng. (29) Laboratory.	2.	Mech. Eng. (30) Laboratory.	2.
Polit. Science (11) Polit. Inst. of U. S.	3.	Economics (6) Railroads, Crises, etc.	2.	Economics (7) Labor and Capital.	2.

THESIS

COURSE IN MANUAL TRAINING

This course is designed for those students who wish to become teachers of manual training in the public schools of secondary grade or in the technical schools. Such manual training is based upon knowledge of the relation of the body and brain; its educational value is very great, and recognition of its importance is causing it to be put into more of the schools of the country each year. The advancement of manual training in the schools is retarded by one factor at least, and that is the lack of teachers suitably trained to instruct in its different branches. This course is planned to meet this demand. It is necessary that a teacher of manual training in our public schools be of the same high standard as his associates, in character, general culture, uplifting influence. He must possess knowledge of the methods of instruction, ability in the art of teaching; and coupled with these he must have skill in his technical lines. He must be familiar with the tools, materials and processes used, and acquainted with the different effects on his pupils of the training and work with these. He must understand that enlarged power and ability in the student is what he is seeking; that the pupil himself, and not the inanimate object used, is the real product of manual training.

As this course is a professional one, the studies found in it are those which will both broadly and specifically train for the end in view. There is a large amount of science work in physics and chemistry, which work is of importance on account of its fundamental character and the preparation it gives for teaching those subjects. The shopwork of the different kinds will furnish the necessary knowledge and the training of the hand, eye and brain; the drawing will give familiarity with that mode of expression of ideas. The industrial arts treat of mechanical movements and their application to machine tools. There is work in the subjects of electrical machinery and steam power plants that the teacher may be capable of dealing with the power used in his shopwork. The studies in the educational field will present the principles underlying education, the part which the different subjects have in the unfolding or development of the pupil, the laws of this development, so that he can deal intelligently with his pupils.

As the course is arranged the student completing the work will be ready for the teaching of manual training of the high school grade; of the drawing accompanying it; also of the science he may have chosen. Thus he may be able to accept a position in some school where manual training is not taught and can gradually introduce it as opportunity offers.

All choice of elective work must be made in consultation with the head of the department and receive his approval.

See also pages 70–72.

COURSE IN MANUAL TRAINING

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

Second Year

FIRST TERM.	Credit hours	SECOND TERM.	Credit hours	THIRD TERM.	Credit hours
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	3.	Drawing (3) Shades, Shadows.	3.
Physics (2) Mechanics, Heat.	3.	Physics (2) Elect'y, Magnetism.	3.	Physics (2) Light, Sound.	3.
Physics (3) Problems.	2.	Physics (3) Problems.	2.	Physics (3) Problems.	2.
Shopwork (7) Woodwork.	3.	Shopwork (9) Adv. Pattern Mak'g.	3.	Shopwork (8) Cabinet Work.	3.
Shopwork (3) Foundry.	3.	Shopwork (11) Forging.	3.	Shopwork (12) Adv. Forging.	3.
Rhetoric (2) Expository Writing.	2.	Rhetoric (3) Brief-Making, etc.	2.	Rhetoric (3) Brief-Making, etc.	2.
Education (1) Elem. Psychology.	3.	Education (1) Elem. Psychology.	3.	Education (1) Elem. Psychology.	3.
Military Drill.		Drill and Gymnasium.		Military Drill.	

Third Year

Drawing (5) Technical.	3.	Industrial Arts (2) Designing.	3.	Industrial Arts (2) Designing.	3.
Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.	Industrial Arts (1) Tools and Machines.	3.
Shopwork (4) Chipping, Filing.	3.	Shopwork (13) Machine Work.	3.	Shopwork (14) Machine Work.	3.
Botany (9) Dendrology.	2.	History (1*b*) U. S. Political.	2.	History (1*b*) U. S. Political.	4.
Chemistry (20) Quantitative.	4.	Chemistry (20) Quantitative.	4.	Chemistry (20) Quantitative.	4.
Chemistry (21) Physical.	2.	Chemistry (21) Physical.	2.	Chemistry (21) Physical.	2.
or		or		or	
Physics (5) Laboratory.	5.	Physics (5) Laboratory.	5.	Physics (5) Laboratory.	5.

Fourth Year

Shopwork (15) Adv. Mach. Work.	3.	Shopwork (16) Adv. Mach. Work.	3.	Mech. Eng .(32) Power Plants.	5.
Elect. Eng. (6) Lectures.	2.	Elect. Eng. (6) Lectures.	2.	Mech. Eng. (28) Laboratory.	2.
Elect. Eng. (7) Laboratory.	2.	Elect. Eng. (7) Laboratory.	2.	Education (5) Science of Educ.	4.
Education (5) Science of Educ.	4.	Education (5) Science of Educ.	4.		
Polit. Science (11) Polit. Inst. of U. S.	3.				
Electives	2–5.	Electives	5–7.	Electives	5–7.

THESIS

COURSE IN MECHANICAL ENGINEERING

Mechanical Engineering deals principally with the generation of power or effective energy from the forces of nature and the utilization of this power through mechanical devices. The fundamental science underlying this profession is physics, especially that part of physics relating to mechanics and heat, though mathematics is the medium by which these physical principles are made applicable to practical problems.

The training given in the course is designed to equip men with such general and technical knowledge, that they can enter at once and with equal ease into positions in any of the numerous subdivisions of mechanical engineering, and adapting themselves to the needs of the stituation, can rapidly acquire the experience which is essential to that particular work. And at the same time it must be noted that no one lacking this broad preliminary view of the profession as a whole, can ever expect to attain the highest skill in any one of its specialties.

The technical work of the course begins with physics, which is taught by a year's text book course, supplemented by two terms of laboratory work. This is followed in turn by mechanics, mechanism, the strength of materials, bridge stresses, machine design, thermodynamics, prime movers, steam boilers, shop appliances, hydraulic machinery, and the metallurgy of fuel, iron and steel.

The theoretical principles of these subjects cannot be made real and practical to the student except by an extended system of laboratory courses. Three such are provided, in shopwork, drawing and experimental engineering, respectively. The shopwork course trains the student in those handicrafts in constant use in all mechanical industries, viz., forging, chipping and filing, carpentry, pattern-making, foundry work, and the use of the principal metal-working machine tools.

The course in drawing includes free hand drawing, lettering, projection, descriptive geometry, shades, shadows and perspective and technical drawing, all leading up to the three terms of machine design which teach the student to use this drawing as one of the important tools of his profession.

The experimental engineering, coming in the last year of the course, gives the student opportunity to gain familiarity with boiler tests, determinations of the efficiency of steam power-plants, gas engines, hydraulic and refrigerating machinery, measurements of friction, losses of power in transmission, and many other important technical problems, and is of the greatest use to the student in enabling him to face practical work with confidence in himself.

See also pages 74–79.

COURSE IN MECHANICAL ENGINEERING

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

Second Year

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	3.	Drawing (3) Shades, Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics, Heat.	3.	Physics (2) Elect'y, Magnetism.	3.	Physics (2) Light, Sound.	3.
Shopwork (11) Forging.	3.	Physics (7) Laboratory.	2.	Physics (7) Laboratory.	3.
Rhetoric (2) Expository Writing.	2.	Rhetoric (3) Brief-Making, etc.	2.	Rhetoric (3) Brief-Making, etc.	2.
Shopwork (3) Foundry.	2.	Shopwork (4) Chipping, Filing.	3.	Shopwork (13) Machine Work.	3.
Military Drill.		Drill and Gymnasium.		Military Drill.	

Instruction in wood-working is given in this course. It does not appear in this Catalogue, owing to intended rearrangements of the shopwork courses, which will include a summer course of four weeks.

Third Year

Mech. Eng. (6) Mechanics.	5.	Mech. Eng. (6) Mechanics.	5.	Mech. Eng. (7) Strength Materials.	5.
Mech. Eng. (12) Laboratory.	2.	Mech. Eng. (3) Mechanism.	5.	Mech. Eng. (3) Mechanism.	2.
Drawing (5) Technical.	3.	Mech. Eng. (22) Timber, Masonry.	3.	Drawing (7) Photography.	2.
Metallurgy (4) Fuels and Iron.	5.	Metallurgy (4) Steel.	2.	Civil Eng. (19) Trusses.	5.
Shopwork (14) Machine Work.	3.	Shopwork (15) Adv. Mach. Work.	4.	Mech. Eng. (32) Power Plants.	5.
Mathematics (11) Diff. Equations.	1.				

Fourth Year

Mech. Eng. (33) Engines and Boilers.	5.	Mech. Eng. (34) Thermodynamics.	5.	Mech. Eng. (19) Machine Design.	5.
Mech. Eng. (27) Laboratory.	5.	Mech. Eng. (14) Laboratory.	1.	Mech. Eng. (15) Laboratory.	3.
Mech. Eng. (18) Machine Design.	5.	Mech. Eng. (18) Machine Design.	5.	Mech. Eng. (21) Thesis.	5.
Elec. Eng. (6) Lectures.	2.	Elec. Eng. (6) Lectures.	2.	Industrial Arts (5) Shop Appliances.	3.
Elec. Eng. (7) Laboratory.	2.	Elec. Eng. (7) Laboratory.	2.	Mech. Eng. (31) Hydraulic Machinery.	3.

THESIS

COURSE IN MINING ENGINEERING

The profession of mining engineering is peculiar in the wide range of work it covers. It involves two distinct fields; that of the engineer, presented in the locating, exploiting and operating of mining properties, and that of the chemist and metallurgist in the reduction of ores and the treatment of fuels, as in coke manufacture. A man may devote himself largely to either of these departments, but a competent understanding of both is essential to the successful designing and development of mining or metallurgical plants.

The course preparatory to such a profession must be a broad one, including a thorough training in general science, especially chemistry, mathematics, mineralogy and geology, as well as in the use of English, and, as far as possible, foreign languages.

With this as a foundation there must be given special instruction in the arts which are related particularly to mining and metallurgy, and which usually furnish the first employment to the graduate, such as drafting, surveying, technical chemical analysis and assaying. Experience has shown that these subjects can be so taught in college as to enable a man to be of use in the industry during the time in which he is acquiring that experience and judgment which are essential to his ultimate success.

Finally the advanced work of the profession must be fully treated. Such work naturally occupies the later years of the course, being necessarily preceded by the mathematics and the general science training. The course which follows has been framed on these general principles.

The third year is largely devoted to special professional studies. The work in metallurgy is extended and developed in special lectures on the metals, their properties and reduction, fuel, furnaces, refractory materials and the principles of slag formation and furnace charging. Fire assaying of gold, lead and silver ores is taught practically.

The engineering side of the course is developed in this year by training in the principles of construction, as given in mechanics, strength of materials and truss stresses. Surveying is taught by lectures, recitations and extended field practice.

In the fourth year of the course the problems of mine engineering and metallurgical constructions are developed in lectures covering the theory and practice of mine development and operation, furnace construction and design, etc., and are supplemented by practical work in the drafting room and by visits to accessible mines and metallurgical works for study and comparison.

See also pages 80–86.

COURSE IN MINING ENGINEERING

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

Second Year

FIRST TERM.	Credit hours	SECOND TERM.	Credit hours	THIRD TERM.	Credit hours
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	3.	Drawing (3) Shades, Shadows.	3.
Mathematics (18) Space Analytics.	5.	Mathematics (19) Calculus.	5.	Mathematics (20) Calculus.	5.
Physics (2) Mechanics, Heat.	3.	Physics (2) Elect'y, Magnetism.	3.	Physics (2) Light, Sound.	3.
Metallurgy (5) Laboratory.	5.	Metallurgy (5) Laboratory.	5.	Metallurgy (5) Laboratory.	5.
Shopwork (7) Woodwork.	2.	Shopwork (11) Forging.	2.	Metallurgy (2) Mineralogy.	3.
Military Drill.		Drill and Gymnasium.		Military Drill.	

Third Year

Mech. Eng. (6) Mechanics.	5.	Mech. Eng. (6) Mechanics.	5.	Mech. Eng. (7) Strength Materials.	5.
Metallurgy (4) Fuels and Iron.	5.	Metallurgy (4) General.	5.	Metallurgy (3) Deter. Mineralogy.	5.
Mine Eng. (4) Mine Surveying.	5.	Metallurgy (6) Assaying.	5.	Civil Eng. (19) Trusses.	5.
Rhetoric (2) Expository Writing.	2.	Rhetoric (3) Brief-Making, etc.	2.	Rhetoric (3) Brief-Making, etc.	2.

Fourth Year

Mine Eng. (5) Mine Engineering.	5.	Mine Eng. (5) Mine Engineering.	5.	Mine Eng. (5) Mine Engineering.	5.
Geology (2) General.	5.	Geology (6) Economic.	3.	Mech. Eng. (25) Laboratory.	5.
Metallurgy (8) Ore Dressing.	2.	Metallurgy (7) Metal Construction.	3.	Mine Eng. (6) Plans and Specifications.	5.
Elect. Eng. (6) Lectures.	2.	Elect. Eng. (6) Lectures.	2.	Drawing (7) Photography.	2.
Elect. Eng. (7) Laboratory.	2.	Elect. Eng. (7) Laboratory.	2.		
		Geology (7) Petrography.	2.		

THESIS

COURSES NOT LEADING TO A DEGREE

The following short courses are offered by the University, in the belief that they will meet the needs of a large class of young men who for any reason will not or cannot obtain the benefits of the thorough courses already described. The University recognizes that there are many valid reasons which may stand in the way of some, whose ability to receive and use the highest forms of education is without question, and it is thought that in extending opportunities for such training as will be available to these young men, the University is filling a longfelt want in the scheme of engineering education and is certain to grow into closer contact with the industrial life of the State.

No diploma is given to those who complete these courses, but a certificate is issued stating the list of studies which the student has taken in his course, and in which his work has been satisfactory.

The requirements for admission to these short courses are very much lower than for admission to regular collegiate work. It is clear that to reach the young men for whom these courses have been designed, it is necessary that the conditions of admission and attendance shall be shorn of every complication and that the opportunity extended shall be within the grasp of all, and with the minimum of formality or restriction. It is considered, however, that those who accept these opportunities are men, mature in character and steadfast in their purpose to gain sufficient technical education for their needs, and who are making a sacrifice of time at an age when time has begun to be precious.

The somewhat elementary character of some of the work of these courses may attract the attention of some, who as candidates for admission to regular collegiate work could not be admitted on account of insufficient preparation. To all such students it is proper to state that these courses are in no sense designed as preparatory schools for those who desire ultimately to enter college, and it is not the purpose of the college to permit such use to be made of them. Therefore, every candidate for admission to the short courses, will be expected to satisfy the Committee on Entrance that his previous experience will enable him to utilize this opportunity in a proper way.

SHORT COURSE IN CLAY-WORKING

The two-year or industrial course is designed to assist young men who have already been actively engaged in the Ceramic industries, and who, on account of mature years, or lack of means, or lack of previous educational advantages, are unable to avail themselves of the full and complete course, and yet who wish to increase their earning power or chances of promotion by fitting themselves for other than routine labor. The requirements for admission to this course are very low, and the work required throughout is much less severe than that of the four-year course; in fact, anyone who is willing to really apply himself, can retain his membership in this class, but there is no place for any but those who are thoroughly in earnest, and poor work will not be accepted from those who are able to do good work.

In short, in this industrial course, the department recognizes its closest medium of communication with the wants of the clay industries, and it is intended to so maintain this course as always to render the greatest good to the greatest number.

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

First Year

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Chemistry (7) Inorganic.	5.	Chemistry (7) Inorganic.	5.	Chemistry (12) Analytical.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Geology (1) Phys. Geography.	5.
Mathematics (1) Algebra.	5.	Mathematics (3*a*) Geometry.	5.	Shopwork (11) Forging.	3.
				Shopwork (4) Chipping, Filing.	2.
Military Drill.		Drill and Gymnasium.		Military Drill.	

Second Year

Ceramics (1) Chem. Analysis.	5.	Ceramics (2) Analysis of Clays.	5.	Ceramics (3) Analysis of Glazes.	5.
Ceramics (4) Gen. Principles.	5.	Ceramics (5) Brick.	5.	Ceramics (6) Pottery.	5.
Geology (2) General.	5.	Geology (6) Economic.	3.	Drawing (11) Mechanical.	5.
		Drawing (1) Freehand.	2.		
Military Drill.		Military Drill.		Military Drill.	

See also pages 44–48.

SHORT COURSE IN INDUSTRIAL ARTS

This course is primarily designed to extend the benefits of the same kind of training as that given in the four-year course in this subject to that class of young men who may be unable for any reason to undertake a course of four years' duration, but who aspire to become actively engaged in factory work. It has been the aim to give, in as condensed a form as possible, those studies which will most rapidly and easily be turned to practical account in manufacturing operations; such as drawing, shopwork, use of machine tools, etc., together with a grounding in the physics and mathematics which underlie these operations.

The course will be found most valuable to young men already engaged in factory work, who find themselves limited from rising in their work on account of lack of technical education.

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

First Year

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Drawing (1) Freehand.	1.	Drawing (1) Freehand.	1.	Drawing (1) Freehand.	1.
Drawing (8) Geometric.	2.	Drawing (8) Projections.	2.	Drawing (2) Lettering.	2.
Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.
Mathematics (3) Plane Geometry.	5.	Mathematics (13) Space Geometry.	5.	Mathematics (14) Trigonometry.	5.
Shopwork (7) Pattern Making.	3.	Shopwork (9) Adv. Pattern Making.	3.	Shopwork (11) Forging.	3.
Military Drill.		Drill and Gymnasium.		Military Drill.	

Second Year

Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	3.	Drawing (3) Shades, Shadows.	3.
Industrial Arts (1) Tools, Machines.	3.	Industrial Arts (1) Tools, Machines.	3.	Industrial Arts (1) Tools, Machines.	3.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Geology (1) Phys. Geography.	5.
Shopwork (3–4) Foundry, Filing.	5.	Shopwork (13) Machine Work.	5.	Shopwork (15) Adv. Mach. Work.	5.
Military Drill.		Military Drill.		Military Drill.	

See also pages 70–72.

SHORT COURSE IN MINING

The short course in mining is especially designed for young men who have had practical experience in mines, and wish to study mine surveying, drafting, the problems of ventilation, drainage, haulage, mine operating, etc., and also something of the sciences bearing upon their work, but have neither the time nor the preparation for a full college course. The first year is devoted to a thorough study of the elementary mathematics and sciences necessary to prepare the student for the practical work of the second year. The experience of the past fourteen years has shown beyond any doubt that any enterprising young miner can master the subject sufficiently well in the time assigned to materially increase his earning capacity and chances for promotion in his occupation.

Personal instruction is given, and it is made thoroughly practical and of such a character as to best adapt it to the needs of the individual student.

NOTE — The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

First Year

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.	Mathematics (2) Algebra.	5.
Mathematics (3) Geometry.	5.	Mathematics (13) Geometry.	5.	Mathematics (14) Trigonometry.	5.
Physics (1) Elementary.	5.	Physics (1) Elementary.	5.	Geology (1) Phys. Geography.	5.
Military Drill.		Drill and Gymnasium.		Military Drill.	

Second Year

Drawing (1) Freehand.	2.	Drawing (4) Drafting.	3.	Drawing (2) Lettering.	2.
Drawing (3) Projections.	3.	Geology (4) Elementary.	5.	Shopwork (11) Forging.	3.
Chemistry (7) Inorganic.	5.	Chemistry (13) Laboratory.	3.	Metallurgy (9) Mineral Chemistry.	5.
Mine Eng. (1) Mine Surveying.	5.	Mine Eng. (2) Ventilat. Haulage.	5.	Mine Eng. (3) Mine Operating.	5.
Military Drill.		Military Drill.		Military Drill.	

See also pages 80–86.

MECHANICAL DRAWING ROOM

FREE HAND DRAWING ROOM

Departments of Instruction

ARCHITECTURE

(DEPARTMENT OF DRAWING.)

Office, Hayes Hall, Room 22

Professor Bradford

This work is carried on in the rooms of the Department of Drawing, occupying the third floor of Hayes Hall. The material equipment, in addition to that of the Department of Drawing, consists of models in plaster and wood illustrating the constructive and ornamental forms of the different styles of architecture, a collection of architectural photographs and lantern slides, architectural drawings and specifications of erected structures, a collection of plates of architectural forms and ornament, samples of material used in constructive work, instruments for experimental work in heating and ventilating, such as anemometers, weather bureau hygrometers, carbonic acid testers and thermometers. The heating apparatus of the several buildings of the University provide valuable material for this work.

The many and varied architectural structures, which are being continually erected in the city of Columbus and which the students can visit and inspect, furnish material of a practical nature the value of which cannot be overestimated.

The library contains very valuable technical and historical architectural literature.

4. **Specifications.** Lectures and practice in preparing Specifications for Architectural Structures. Two periods a week. (Second Term, fourth year, Course in Architecture.)

5. **Decoration and Ornament.** Lectures on the different styles of carved ornament and decorative color. The practice part of this subject will be incorporated in the clay Modeling and Designing. Three periods a week. (First term, third year, Course in Architecture.)

6. **Estimates and Superintendence.** Lectures and practice in preparing estimates for structures designed in Courses 8, 11, 12 and 13, and the duties of superintendence. Four periods a week. (Third Term, fourth year, Course in Architecture.)

7. **Heating, Ventilating and Plumbing.** Lectures and experimental work. Lectures on the principles and methods of heating and ventilating and of sanitary plumbing. Experimental work is carried on with the heating and ventilating plants in the different University buildings. Five periods a week. (Second Term, fourth year, Course in Architecture.)

8. **Designing.** Lectures and Practice. Steel skeleton and fire proof construction. Five periods a week. (Second Term, fourth year, Course in Architecture.)

9. **History of Architecture.** Lectures illustrated by lantern slides. Three periods a week. (First Term, second year, Course in Architecture.)

10. Same as 9. (Second Term, second year, Course in Architecture.)

11. Same as 10. (Third term, second year, Course in Architecture.)

12. **Architectural Drawing.** Drawing architectural ornament, details of orders and styles, with the special object of impressing upon the student's mind the architectural characteristics considered in Course 9. Two periods a week. (First Term, second year, Course in Architecture.)

13. Same as 12. (Second Term, second year, Course in Architecture.)

14. Same as 13. (Third Term, second year, Course in Architecture.)

15 **Designing**. Lectures and practice in designing structures adapted to modern requirements. Four periods a week. (First Term, third year, Course in Architecture.)

16. **Designing.** Lectures and practice. Two periods a week. (Second Term, third year, Course in Architecture.)

17. **Designing.** Lectures and practice. Four periods a week. (Third Term, third year, Course in Architecture.)

18. **Designing.** Four periods a week. (First Term, fourth year, Course in Architecture.)

19. **Designing.** Four periods a week. (Third Term, fourth year, Course in Architecture.)

20. **Thesis.** Original design, to be accompanied with written description, specifications and estimate. Five periods a week. (Third Term, fourth year, Course in Architecture.)

ASTRONOMY

Office, Emerson McMillin Observatory

Professor H. C. Lord, Mr. Ball

The importance of a practical knowledge of the methods of astronomical observation to Civil Engineers made the establishment of the Emerson McMillin Observatory a very important advantage to the College of Engineering. The instruction given to the Engineering students includes the use of this fine equipment in practical work under the immediate supervision of the Director.

The building and its equipment is the gift of Mr. Emerson McMillin, of Columbus, Ohio, and was built during the summer of 1895. The first floor is divided by a hall and stairway into two parts. The east wing contains an office, library, clock room and a large, well lighted room furnished with tables for the students, where they reduce their observations and keep the records of their work. The west wing contains the transit house, the dome and photographic dark room. The transit house is a light frame structure, so designed as to be kept as free as possible from heat radiated by any heavy wall of masonry. The dome is a wooden framework covered on the outside with canvas.

The equipment consists of a twelve-inch equatorial telescope, mounting by Messrs. Warner & Swasey, objective by Mr. Brashear, with a large and powerful spectroscope by Mr. Brashear. This instrument is adapted to use either one or two prisms or a grating, and is provided with a double set of objectives, one corrected for the visual and one for the photographic rays; a position micrometer with a seven-inch circle by Messrs. Warner & Swasey; a combined zenith telescope and transit instrument of three inches clear aperture by Mr. G. N. Saegmuller; a sidereal clock by Clemens Riefler, of Munich; a comparater by Carl Ziliss; a four-inch portable equatorial by Alvin Clark; a chronograph by Warner & Swasey; sextants, chronometers, meteorological instruments, etc. There is also provided a spectroscopic laboratory, equipped with a Brashear concave grating spectroscope, a two-horse power gas engine and dynamo; a storage battery, and a large induction coil. In addition to the above, Mr. McMillin's gift provides for an excellent astronomical library.

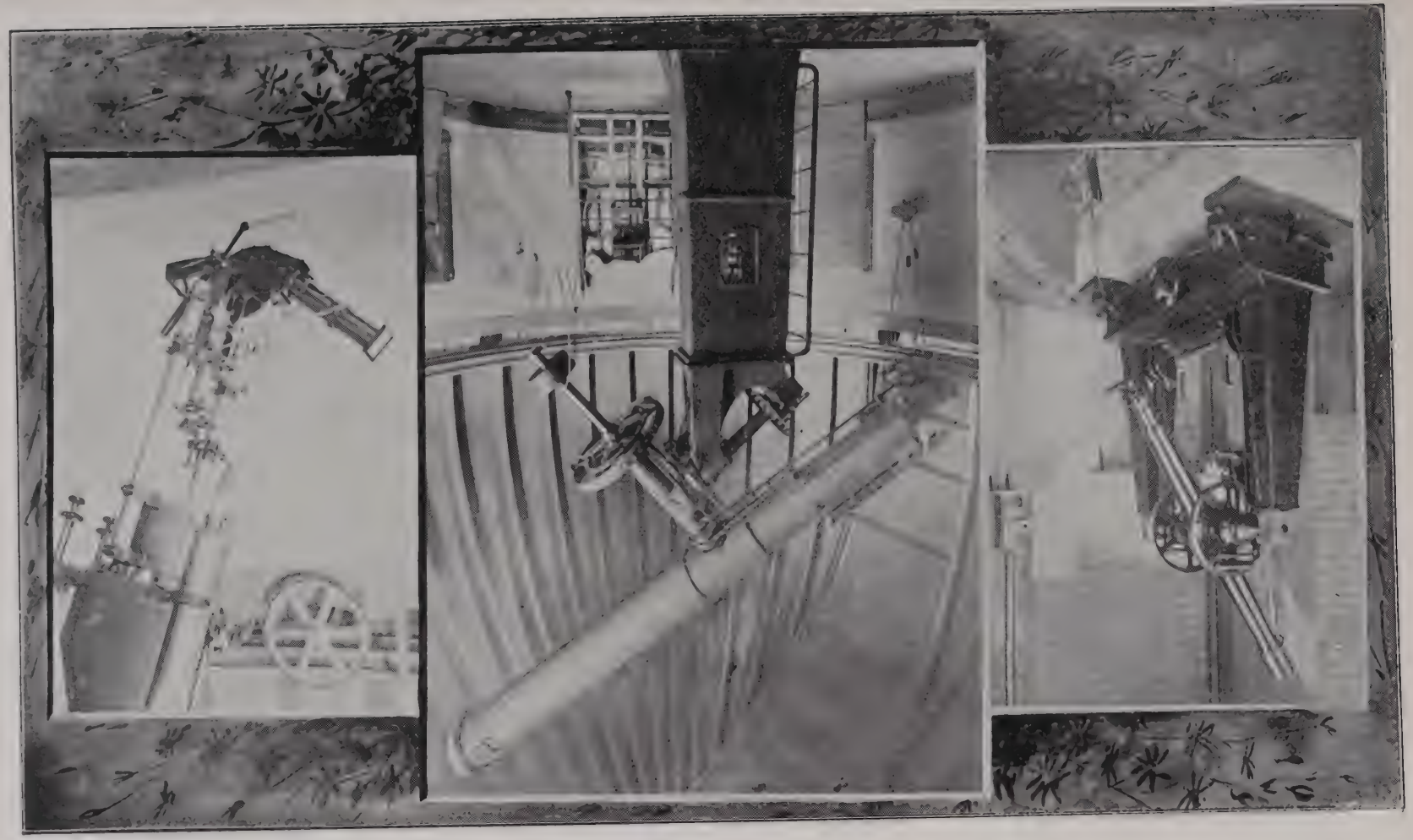
2. **Astronomy, Geodosy and Least Squares.** Lectures on practical Astronomy, supplemented by practice with the instruments of the Emerson McMillin Observatory. Text-book, Doolittle. Three times a week. (Three Terms, third year, Course in Civil Engineering.)

BOTANY

Office, Botanical Hall

Professor Kellerman

9. **Dendrology.** Lectures and field work. Kellerman's Forest Trees of Ohio and reference books are used. The native trees are studied and illustrative collections made. Twice a week. (First Term, third year, Course in Manual Training.)



CERAMICS

(DEPARTMENT OF CLAY WORKING AND CERAMICS)

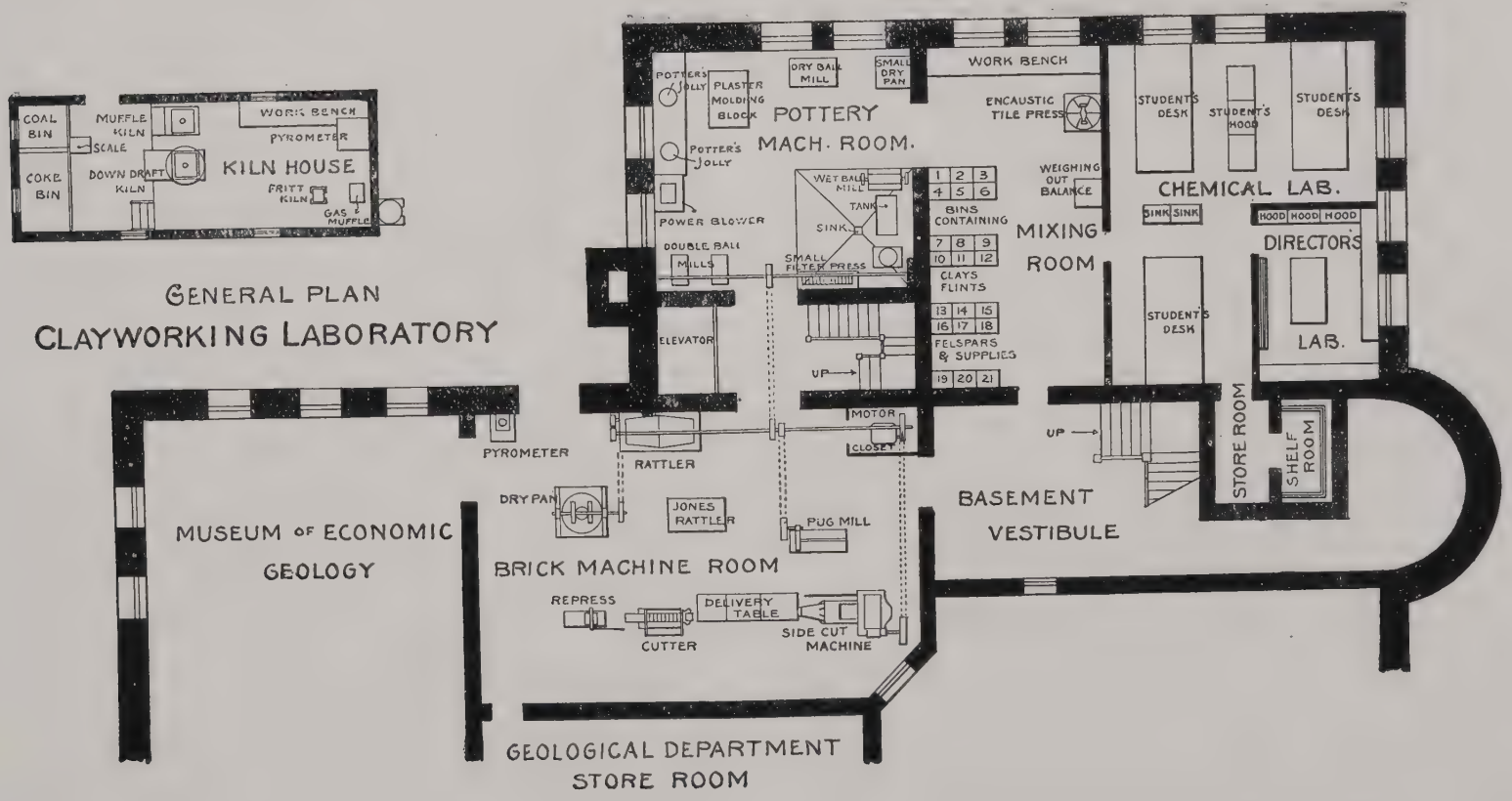
Office, Orton Hall, Room 4

Professor Edward Orton, Jr., Mr. Peppel, Mr. Bleininger

The facilities of the Department for study in the field of clay working comprise: 1st. A convenient chemical laboratory, specially designed and equipped for the analysis and decomposition of silicates. Provision has been made for the use of hydrofluoric acid with safety, and the platinum ware has been made to order with this purpose in view. 2d. A complete mechanical outfit for the preparation of clays for pottery manufacture and the production of the ware itself, of any grade from earthen wares to porcelain. The machinery is of the latest types and comprises all important varieties in use for grinding, tempering, washing, filtering and molding. 3d. A similar plant for the manufacture of brick, tiles, pipes and hollow goods. The machinery here is of full size and samples up to a ton in weight can be received and transformed into the finished articles by any or all of the standard methods in commercial use. The power for this purpose is derived from a fine electric motor, driven from the University power plant. 4th. A kiln house, equipped with a kiln in which several hundred bricks, or an equivalent quantity of sewer pipe, stoneware, or pottery can be burnt. The fuel is intended to be coke, except in special cases where the fuel available for burning clay wares is to be made the subject of test. There is also provided a crucible melting furnace and a muffle furnace for testing glazes. A muffle kiln of larger size for burning pottery, glazed ware and decorated wares has recently been put into operation. 5th. A ceramic museum, containing a collection of American pottery and clay products of every class, is in process of installation. 6th. A library of the best literature on the subject, mainly German, but containing a few English and French works, and the trade periodicals.

The facilities of the Department for study in the field of cement and mortar materials comprise in addition to the foregoing plant, much of which is especially well suited to this purpose, the following special apparatus. 1st. An improved dry-ball-mill, of chilled iron for grinding the raw material together, and for grinding the cement clinker. 2d. A small cupola, fired with coke and using air blast, for the vitrification of the refractory silicates used. 3d. Access to the complete and well appointed cement testing laboratory of the Department of Civil Engineering.

These facilities permit the Department to offer exceptional opportunities to any who wish to specialize in this important field of manufacture.


COAL BIN
MUFFLE KILN
WORK BENCH
PYROMETER
SCALE
COKE BIN
DOWN DRAFT KILN
KILN HOUSE
FRITT KILN
GAS MUFFLE
GENERAL PLAN
CLAYWORKING LABORATORY
POTTER'S JOLLY
PLASTER MOLDING BLOCK
DRY BALL MILL
SMALL DRY PAN
WORK BENCH
POTTERY
MACH. ROOM.
ENCAUSTIC TILE PRESS
STUDENT'S DESK
STUDENT'S HOOD
STUDENT'S DESK
POTTER'S JOLLY
WET BALL MILL
TANK
SINK
1 2 3
4 5 6
BINS CONTAINING
WEIGHING OUT BALANCE
CHEMICAL LAB.
POWER BLOWER
DOUBLE BALL MILLS
SMALL FILTER PRESS
7 8 9
10 11 12
CLAYS FLINTS
MIXING ROOM
SINK SINK
HOOD HOOD HOOD
DIRECTOR'S LAB.
ELEVATOR
13 14 15
16 17 18
FELSPARS & SUPPLIES
19 20 21
UP
STUDENT'S DESK
MOTOR
CLOSET
UP
STORE ROOM
SHELF ROOM
PYROMETER
RATTLER
DRY PAN
JONES RATTLER
PUG MILL
BASEMENT VESTIBULE
MUSEUM OF ECONOMIC GEOLOGY
BRICK MACHINE ROOM
REPRESS
DELIVERY TABLE
CUTTER
SIDE CUT MACHINE
GEOLOGICAL DEPARTMENT STORE ROOM

1. **Ceramic Chemistry.** This course is open only to those who have Completed General Chemistry 12. The student begins the quantitative analysis of salts and chemicals, and later works on limestone and other easy materials. Five times a week. (First Term, second year, Course in Ceramics and Short Course in Clay-working.)

2. Continuation of Course 1. The student begins the quantitative analysis of clays and complex minerals, working first on samples of known composition, and later on unknown materials. Five times a week. (Second Term, second year, Course in Ceramics and Short Course in Clay-working.)

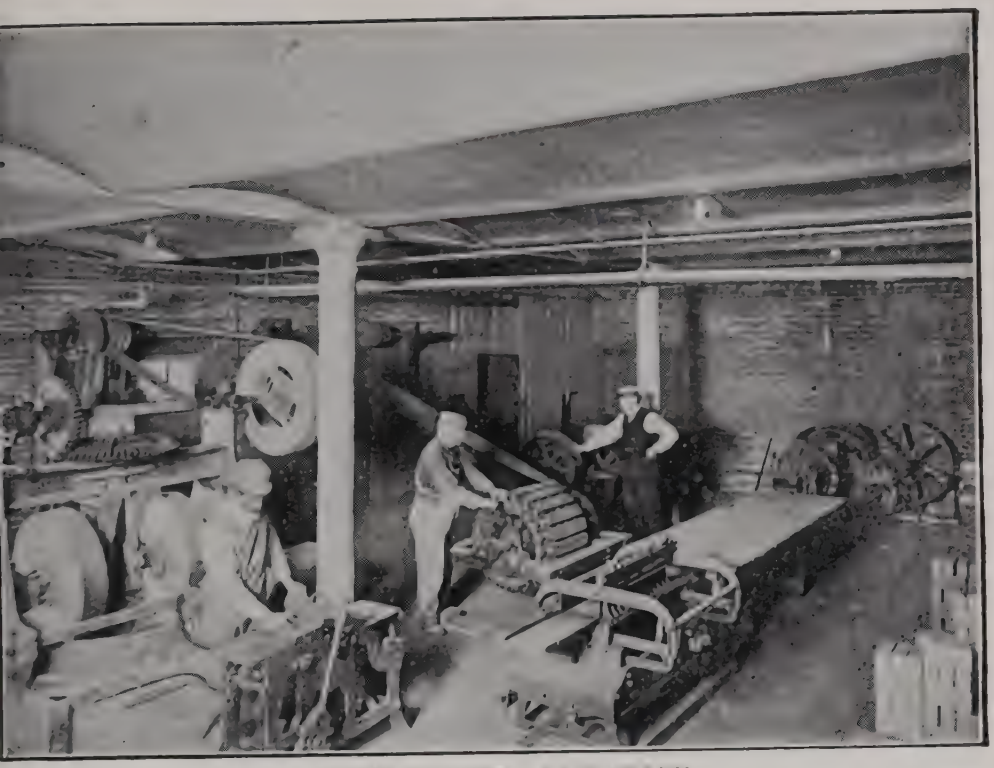
3. Continuation of Course 2. The student completes the ultimate analysis of clays and begins the proximate or "Rational" analysis of clays and pottery bodies, following the methods of Seger. Five times a week. (Third Term, second year, Course in Ceramics and Short Course in Clay-working.)

4. **Lectures on Clay Manufacture** (supplemented by frequent recitations). The origin, composition and properties of clays and other minerals employed in the clay, glass and cement industries. Five times a week. (First Term, third year, Course in Ceramics; and second year, Short Course in Clay-working.)

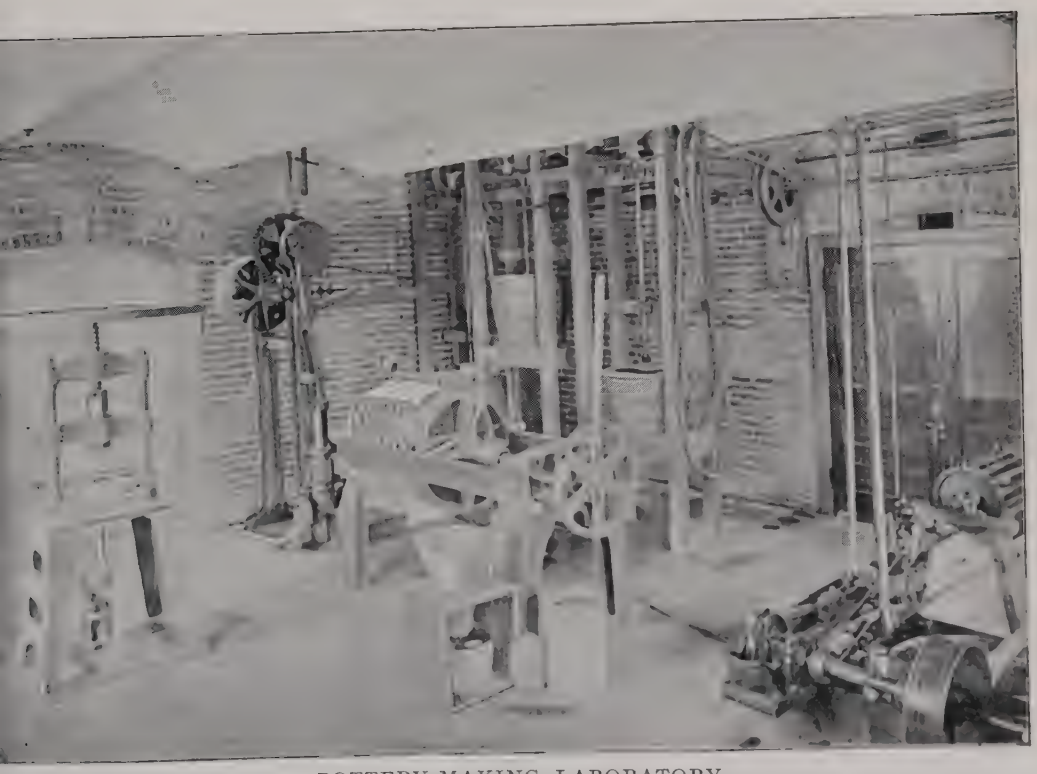
5. Continuation of Course 4. A series of lectures, with recitations, on the general principles of the manufacture of bricks and the coarser clay wares, including the selection and winning of the materials, their preparation, manufacture, burning and testing. Five times a week. (Second Term, third year, Course in Ceramics; and, second year, Short Course in Clay-working.)

6. Continuation of Course 5. A series of lectures, with recitations, on the classification and manufacture of pottery and the finer grades of clay wares, including the selection of the materials, preparation of the bodies, manufacture of the ware, preparation of the glazes, burning and decoration of the wares and the pyrometry of ceramics. Five times a week. (Third Term, third year, Course in Ceramics; and, second year, Short Course in Clay-working.)

7. **Ceramic Chemistry.** Continuation of Course 3. Open only to those who have completed that course. The analysis of glasses and glazes, devoting special attention to the use of hydrofluoric acid in silicate analysis, and to the determination of lead and boracic acid. Five times a week. (Second Term, third year, Course in Ceramics.)



BRICK-MAKING LABORATORY



POTTERY-MAKING LABORATORY

9. **Laboratory Work in Ceramics.** Open only to those who have completed Courses 3 and 6. The student will undertake the production of such wares as are made from single clays; then wares made by blending two or more natural clays; and, then, such wares as are made from an artificial body. In each case the bodies made will be burnt and tested. Five times a week. (First term, fourth year, Course in Ceramics.)

10. Continuation of Course 9. The student will practice on the production of glasses and glazes, beginning with the natural "slip glazes" and taking successively the soft raw-lead glazes, the fritted lead-boracic-acid glazes, and the hard-fire leadless porcelain glazes. In each case the glazes will be made for use on some definite body, and will be made to "fit." Five times a week. (Second Term, fourth year, Course in Ceramics.)

11. Continuation of Course 10. The student will practice on the use of the coloring and opacifying oxides in glazes, and on the production of colors for the decoration of pottery, and of body-stains. Five times a week. (Third Term, fourth year, Course in Ceramics.)

12. **Lectures on Cement Manufacture.** The theory of hydraulicity, the compounding, manufacture and testing of natural and Portland cements and hydraulic silicates. Open to students who have had courses 3 and 6. Facilities for laboratory work in making, burning and testing cements will be given. Five times a week. (Second Term, fourth year, Course in Ceramics.)

15. **Thesis.** See requirements for graduation, page 107.

16. **General Principles of Applied Ceramics.** A series of lectures on the chemical technology of the clay, glass and cement industries. Three times a week. (Third Term, fourth year, Course in Chemistry.)

17. **Practice** in making drawings and specifications for brick kilns, brick dryers, pottery kilns, gas producers, glass pot-furnaces, glass tanks, cement kilns and burning cylinders. Students will be allowed to specialize along the lines they intend to follow. Four times a week. (Second Term, fourth year, Course in Ceramics.)

CHEMISTRY

Office, Chemical Hall, Room 20

Professor McPherson, Professor Norton, Associate Professor Henderson, Assistant Professor Foulk, Mr. Gore, Mr. Linville, Mr. Dubois, Mr. Kimberly, Mr. Hance

The Department of Chemistry occupies the larger portion of the Chemical Hall. The main lecture room is situated on the second floor and has a seating capacity of one hundred and seventy-five persons. There are four main laboratories; one for students in elementary chemistry and qualitative analysis, accommodating two hundred and fifty; one for quantitative analysis with desks for fifty; one for advanced qualitative and sanitary analysis and one for organic chemistry, each with accommodations for twenty. In addition to these, there is an office, a balance room, three private laboratories and several smaller rooms, used for combustion work, spectroscopic work and private investigations.

The laboratories are equipped with all the modern conveniences, as water, gas, steam ovens, drying ovens, automatic air blasts, electric lights, etc. Distilled water is piped from the large still in the attic to each room.

Each student has his own desk with drawers and locker. All supplies are obtained from the chemical store room which is liberally supplied with all the apparatus and material necessary for chemical investigation.

The Department is also well equipped with all apparatus necessary for experimentally illustrating the class room work. The main lecture room is furnished with cases which contain a large collection of specimens for purposes of illustration.

7. **Elementary Chemistry.** Inorganic. Lecture, Laboratory and Quiz. Laboratory work; First Term, experiments upon the non-metals; Second Term, principles of qualitative analysis. Five times a week. (First and Second Terms, first year, all four-year courses and Short Course in Clay-working; and First Term, second year, Short Course in Mining.)

8. **Organic Chemistry.** Lectures. Five times a week. (First Term, third year, Course in Chemistry.)

9. **Organic Chemistry.** Laboratory. Five times a week. (Second and Third Term, third year, Course in Chemistry.)

12. **Qualitative Analysis.** Four times a week. (Third Term, first year, all four-year courses and Short Course in Clay-working.)

13. **Qualitative Analysis.** Three laboratory periods a week. (Second Term, second year, Short Course in Mining.)

15. **Sanitary Analysis.** Laboratory and lectures. A study of the most important chemical methods for the analysis of water and air. Four times a week. (Third Term, fourth year, Course in Chemistry.)

16. **Applied Chemistry.** Lectures on Industrial Chemistry. These are made as practical as possible by visits to different chemical works. When possible specialists deliver lectures on subjects belonging to their particular line of work. Three times a week. (Second Term, fourth year, Course in Chemistry.)

17. **Inorganic Preparations.** Four times a week. (First Term, fourth year, Course in Chemistry.)

20. **Quantitative Analysis.** Laboratory, lectures and recitations. Use of the balance and general principles of gravimetric analysis. Drill in the solution of problems in quantitative analysis; study of properties of precipitates; principles of volumetric analysis. Selections are made from such analytical methods as best meet the needs of the students. The samples used for analysis are mixtures or commercial products, the percentage composition of which is not made known to the student until he has reported his own results. Four times a week. (First, Second and Third Terms, second year, Course in Chemistry.) (Chemistry 20 and 21 alternative with Physics 5, First, Second and Third Terms, third year, Course in Manual Training.)

21. **Advanced General Chemistry.** Physical Chemistry. This course includes (*a*) a general survey of inorganic chemistry based upon the arrangement of the elements in accordance with the periodic law, and (*b*) a discussion of the main principles of physical chemistry and their application to general chemical processes. Twice a week. (First, Second and Third Terms, second year, Course in Chemistry.) (Chemistry 20 and 21 alternative with Physics 5, First, Second and Third Terms, third year, Course in Manual Training.)

For courses in the technical analysis of iron, steel, ores, fuels, fluxes, clays, etc., see the Departments of Metallurgy and Ceramics.

CHEMICAL LECTURE ROOM

CIVIL ENGINEERING

Office, Hayes Hall, Room 13

Professor Brown, Associate Professor Sherman, Mr. Davies

The Department occupies the east and west wings of the second floor and one basement room in Hayes Hall. The large and well lighted room of the east wing, 38′ x 47′, is equipped with 48 drawing tables and is used for the department drawing classes. A large case of drawers filled with shop drawings, working drawings and maps, gathered from practicing engineers, is open to students for study and consultation. These drawings lay before them good examples of engineering practice. A considerable outfit of office drawing instruments is provided for those students requiring them in special work. This includes long steel straight edges, large triangles, parallel rulers, protractors, section liners, planimeter, pantograph, etc.

In the west wing are the instrument and blue print rooms, and the recitation room, equipped with electric lantern. The instruments for instruction in surveying include one high grade transit, seven other transits fitted for various kinds of surveying, four leveling instruments, solar compass, solar attachments for two transits, two high grade aneroid barometers, rods, chains, tape lines, hand levels, two current meters for measuring flow of water in streams. There is also a complete camp outfit for the summer field work in surveying.

The blue print room has three large frames and abundant facilities for preparing paper and washing prints.

There is a collection of models for illustration of bridge and roof trusses and of problems in sterotomy. Numerous photographs of bridges and other engineering structures are included.

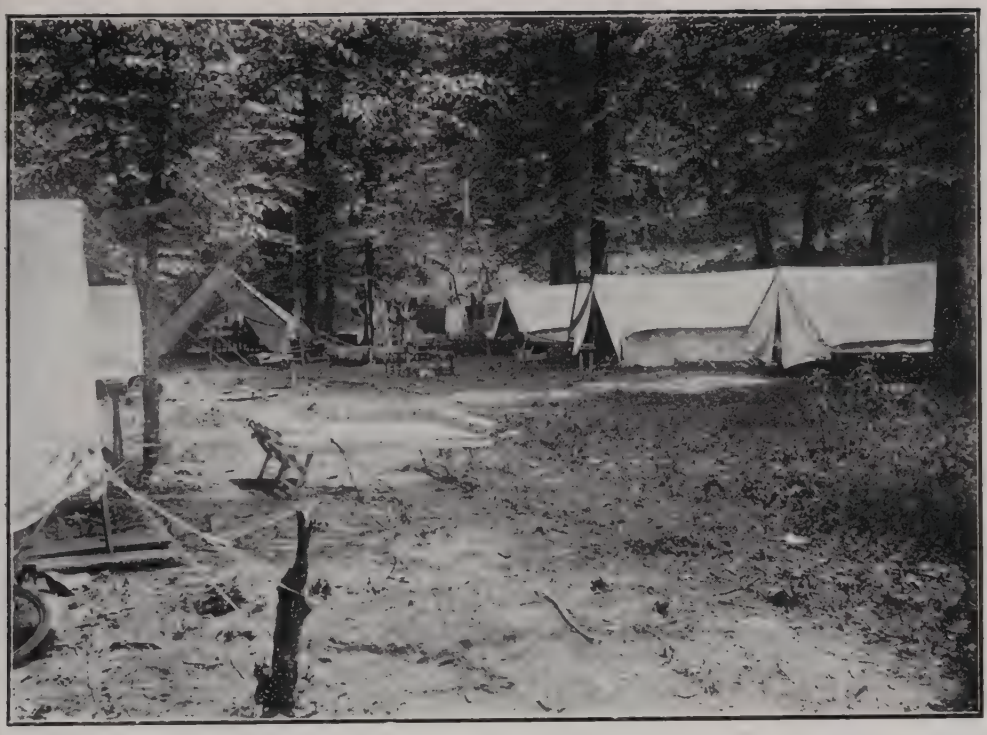
The basement room, 23′ x 38′, is equipped for cement testing with two testing machines, a Boehme hammer, briquette molds, sieves, hot test apparatus, etc.

The Department has, for rating current meters, an excellent course 175 feet long in one side of the reservoir belonging to the University Power Plant.

1. **Land Surveying.** Recitations and field work. Johnson's Theory and Practice of Surveying. Six times a week. (First Term, second year, Course in Civil Engineering.)

2. **Railroad Surveying.** Recitations and field work. Searle's Field Engineering. Six times a week. (Third Term, second year, Course in Civil Engineering.)

3. **Topographical Surveying.** Lectures, field work and drawing. Johnson's Surveying used for reference. Four times a week. (First Term, third year, Course in Civil Engineering.)



SUMMER CAMP.

CLASS IN SURVEYING

4. **Topography.** Platting, pen and tinted work. Reed's Topographical Drawing and Sketching. Four times a week. (Second Term, second year, Course in Civil Engineering.)

6. **Stereotomy.** Recitations, drawing and model cutting. Warren's Stereotomy. Four times a week. (Second Term, third year, Courses in Architecture and Civil Engineering.)

7. **Bridge Stresses.** Recitations and lectures. Part I of Dubois's Stresses in Framed Structures. Five times a week. (Third Term, third year, Course in Civil Engineering.)

8. **Bridge Designing.** Lectures and drawing. Part II of Dubois's Stresses in Framed Structures and Johnson's Modern Framed Structures used for reference. Five times a week. (First Term, fourth year, Course in Civil Engineering.)

10. **Sanitary Engineering.** Lectures. Five times a week. (Third Term, fourth year, Course in Civil Engineering.)

14. **Civil Engineering Laboratory.** Cement testing, adjustment of instruments. Twice a week. (Second Term, fourth year, Course in Civil Engineering.)

15. **Masonry Construction.** Recitations and lectures. Baker's Masonry Construction. Five times a week. (First Term, fourth year, Courses in Architecture and Civil Engineering.)

16. **Highways.** Recitations and Lectures. Byrne's Roads and Streets. Five times a week. (First Term, third year, Course in Civil Engineering.)

17. **Railway Location.** Recitations and lectures. Wellington's Economic Theory of Railway Location. Five times a week. (Second Term, fourth year, Course in Civil Engineering.)

18. **Water Supply.** Recitations and lectures. Five times a week. (Third Term, fourth year, Course in Civil Engineering.)

19. **Trusses.** Lectures and drawing. Five times a week. (Third Term, third year, Courses in Architecture, Mining and Mechanical Engineering.)

21. **Surveying.** Recitations and field work. Davies' Surveying. Three times a week. (Third Term, fourth year, Courses in Architecture and Industrial Arts.)

22. **Summer Course in Field Work.** The students are taken into camp in a rough, broken country and given a thorough drill in land and elementary railroad surveying. The course begins directly after commencement day, and continues four weeks of six days per week, ten hours per day. The work of the student and the discipline of the camp is in the hands of competent instruc-

1—MEASURING VELOCITY OF CURRENTS

2—MAKING CROSS SECTION OF RIVER BED

tors. This course must be preceded by Courses 1, 2 and 4. Students conditioned on any of these courses may be admitted at discretion of instructor in charge. (At conclusion of second year of course.)

23. **Summer Course in Field Work.** Similar to Course 22. Students work on advanced railroad surveying and topographical surveying. This course must be preceded by Courses 3, 22 and 24. Students conditioned in any of these courses may be admitted at discretion of instructor. (At conclusion of third year of course.)

24. **Drawing of Engineering Structures.** Five hours a week. (Second Term, third year, Course in Civil Engineering.)

AT WORK IN THE FIELD.

MODELING ROOM

PHOTOGRAPHIC LABORATORY

DRAWING

Office, Hayes Hall, Room 22

Professor Bradford, Assistant Professor French, Mr. Lewis, Mr. Martin, Mr. Chamberlin

The Department occupies the entire third floor and one room in the basement of Hayes Hall, and is provided with the following equipment for the illustration of the work in drawing and for practical training in the same:

For freehand drawing, water color and oil painting: — A large studio thirty–five by eighty feet, specially arranged and provided with adjustable tilting tables and easels, a well selected collection of pencil, pen and ink, charcoal and color specimens of work, wooden models of geometric forms, plaster–casts of ornaments, flowers, fruit and the antique.

For clay–modeling: — A specially arranged and equipped studio twenty–six by thirty–two feet for modeling in clay and casting in plaster, consisting of modeling stands, moisture box, casting table, modeling tools of wood and steel, stove and vent–hood for the preparation of gelatine molds, and lockers.

For mechanical drawing and mechanical and architectural designing: — A large, well lighted room forty by eighty–five feet, provided with O. S. U. drawing tables (30″ by 36″ tops), a set of Schroeder models, a collection of shop drawings and facilities for blue–printing.

For photography: — A well arranged and equipped dark–room, printing apparatus, copying camera, six view cameras, lenses of long and short focus, telephotographic lens, shutters for instantaneous exposures and an excellent outfit for photo–micrography.

In addition to the above, the library contains a well selected collection of books pertaining to the work of the Department.

1. **Free Hand Drawing.** Practice and occasional lectures. Pencil, charcoal, pen and water–color drawing from copies, models and plaster casts.
   One drawing period a week. (First, Second and Third Terms, first year, Short Course in Industrial Arts.)
   Two drawing periods a week. (First Term, second year, Short Course in Mining; and Second Term, second year, Short Course in Clayworking.)
   Two drawing periods a week. (First and Second Terms, first year of all four–year courses.)

2. **Lettering.** Practice and occasional lectures.
   Two drawing periods a week. (Third Term, first year, Short Course in Industrial Arts; and second year, Short Course in Mining.)

Three drawing periods a week. (Third Term, first year, all four–year courses.)

This course must be preceded by Course 1.

3. **Mechanical Drawing.** Lectures or recitations one period a week: Practice two periods a week. Subjects: Orthographic, Isometric and Oblique Projection and elementary Working Drawings. (First Term, second year, all four–year courses, except Chemistry; and Short Courses in Mining and Industrial Arts.)

Lectures or recitations two periods a week. Practice one period a week Short Course in Industrial Arts and in all four–year courses except Architecture, Chemistry and Civil Engineering; three periods a week in Architecture and Civil Engineering. Subject: Descriptive Geometry. (Second Term, second year.)

Lectures or recitations, one period a week. Practice, two periods a week in Short Course in Industrial Arts and in all four–year courses, except Architecture and Chemistry; four periods a week in Course in Architecture. Subject: Shades, Shadows and Perspective. (Third Term, second year.)

This course must be preceded by Course 2.

4. **Draughting and Blue=printing.** Practice and occasional lectures. Three periods a week. (Second Term, second year, Short Course in Mining.)

This course must be preceded by the first term of Course 3.

5. **Technical Drawing.** Lectures and practice. Rules and methods for making working drawings in machine design, to correctly represent form and dimensions for shop use, and for tracing and blue–printing the same. Three periods a week. (First Term, third year, Courses in Mechanical and Electrical Engineering, Industrial Arts and Manual Training.) This course must be preceded by Courses 2 and 3.

7. **Photography.** Lectures and practice. Lectures: Optics of Photography, Chemistry of Photography, Exposing and Developing, Printing, Lantern Slides, Orthrochromatic Photography and some of the applications of Photography. Practice in outdoor, interior, instantaneous and flashlight photography, copying, lantern slides and printing. Two periods a week. (First Term, third year, Course in Architecture; Third Term, third year, Courses in Civil and Mechanical Engineering; Third Term, fourth year, Courses in Ceramics and Mining Engineering.)

8. **Mechanical Drawing.** Lectures and practice. Geometric and Projection Drawing. Two periods a week. (First and Second Terms, first year, Short Course in Industrial Arts.)

11. **Mechanical Drawing.** Lectures and practice. Five periods a week. (Third Term, second year, Short Course in Clay–working.)

12. **Clay Modeling.** Modeling in clay and casting in plaster ornamental forms from designs, photographs, nature and original designs. Two periods a week. (Second and Third Terms, third year, Course in Architecture.)
This course muse be preceded by Course 1.

14. **Pen Drawing.** Two periods a week. (First Term, second year, Course in Architecture.)
This course must be preceded by Course 1.

18. **Water Color Painting.** Three periods a week. (Second Term, fourth year, Course in Architecture.)

19. **Water Color Painting.** Two periods a week. (Third Term, fourth year, Course in Architecture.)

ECONOMICS AND SOCIOLOGY

Office, University Hall, Room 18

Professor Clark, Mr. Smyser.

Course 1 must precede all other courses except 2, 3 and 4.

1. **Elements of Political Economy.** Text-book, lectures and individual investigations. A careful study of the laws of production, exchange, distribution and consumption of wealth; combined with an analysis of the industrial actions of men as regards land, labor, capital, money, credit, rent, interest, wages, etc.
(a.) (Four hours a week, First Term; two hours a week, Second Term, third year, Course in Industrial Arts.)

2. **Industrial Society.** Twice a week. (First Term, second year, Course in Industrial Arts.)

3. **Industrial and Financial History.** Twice a week. (Second Term, second year, Course in Industrial Arts.)

4. **Transportation Problems.** Lecture. A study of the development and present economic status of roads, canals and railroads in their relation to industry and to the state. Twice a week. (Third Term, second year, Course in Industrial Arts.)

6. **Railroads, Crises, Tariff.** Twice a week. (Second Term, fourth year, Course in Industrial Arts.)

7. **Labor and Capital.** Twice a week. (Third Term, fourth year, Course in Industrial Arts.)

EDUCATION

Office, University Hall, Room 54

Professor Gordy, Mr. Hamilton

1. **Elementary Educational Psychology.** This course is helpful to three classes of students: (1) Those who are not preparing to teach, but who wish to make some study of education in order that they may perform their duties as members of society more intelligently; (2) Those intending to teach and who wish to study the relations between psychology and education; and (3) Those preparing to be superintendents of schools and who wish to get suggestions as to the best method of teaching psychology to teachers. Three times a week. (First, Second and Third Terms, second year, Course in Manual Training.)

   The Science of Education. This course makes a study of the ends of education, educational values, and methods of teaching. It will be found valuable not only to those intending to teach, but to all who hope to exert an intelligent influence on the decision of educational questions. Four times a week. (First, Second and Third Terms, fourth year, Course in Manual Training.)

ELECTRICAL ENGINEERING

Office, Electrical Building, Room 8

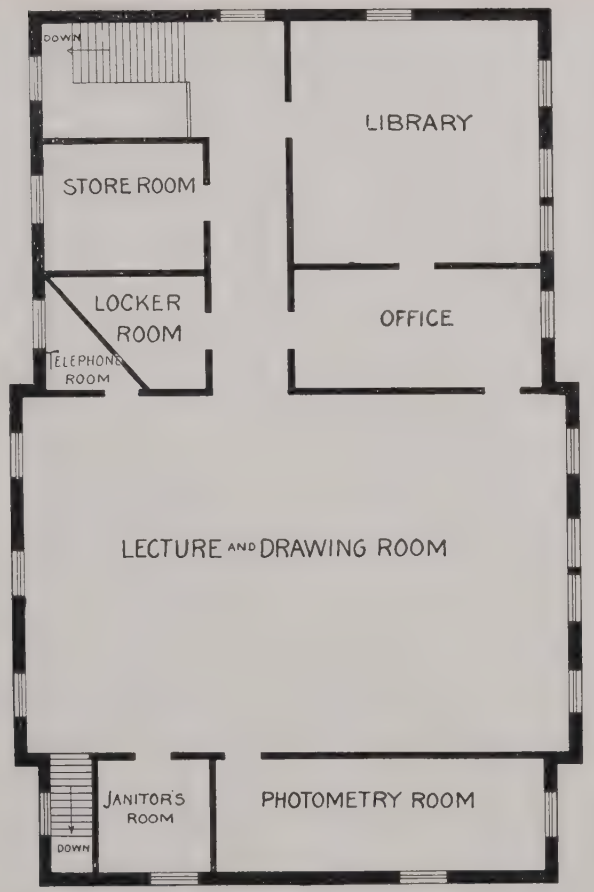
Professor Caldwell, Mr. Edmands, Mr. Fish

This Department has excellent facilities for practical experimental work with dynamo machinery and other electrical apparatus. The elementary electrical testing is provided for in the Physical Department, which permits this Department to devote its time to engineering apparatus proper. The dynamo equipment consists of twentysix machines of various makes and sizes from 40–H. P. down; aggregating over 240 horsepower. These include 110 and 500 volt direct and alternating current generators, polyphase motors, arc and incandescent lighting generators, railway and stationary motors, a rotary converter specially designed for experimental work, and a unipolar dynamo. The two latter, with an alternating current generator and a 2–phase motor, were built by the students, it being the policy of the Department to build much of its apparatus. There are also a number of transformers of different makes, including one for welding and one of special design for testing, both built at the University. Arc lamps of different styles, a 10 kilowatt–hour storage battery, condensers, resistances, circuit breakers, and magnetic testing apparatus also form part of the equipment. The measuring instruments include a standard Weston voltmeter with standard resistances and cells and twelve other Weston volt and ammeters, also four Kelvin static voltmeters, five dynamometers, two wattmeters, galvanometers and 15 other ammeters and voltmeters of different makes. There is a telephone laboratory with apparatus for comparative tests, a variety of transmitters and receivers, lines running to another building, and material illustrative of switch–board practice. Photometry is given at present in the Physical Laboratory, where the equipment in this line is excellent. A large 200,000 volt transformer is being built by some of the students of the Department.

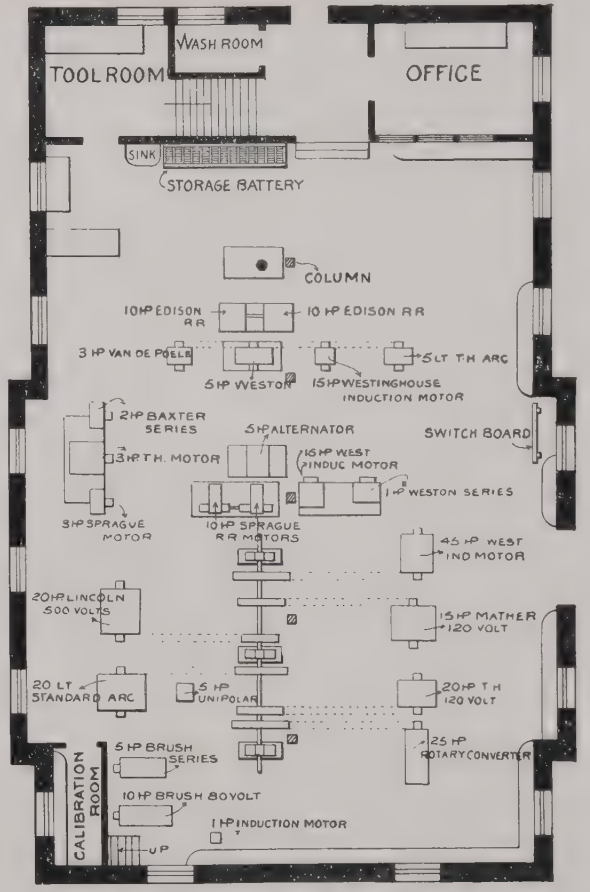
Power for running the dynamo laboratory is supplied by three induction motors from the University Power Plant. There is also a small but well selected and growing collection of photographs, blue–prints, and material illustrative of electrical manufacture. The library of the Department is on the second floor and is especially valuable on account of the completeness of its sets of periodicals and transactions.

The University Power Plant (see page 96) is of great value as illustrative of a model installation. This plant has been mostly installed by students who receive pay for such work.

There is a machine shop and a machinist who gives half his time to construction and repair work.



SECOND FLOOR PLAN



FIRST FLOOR PLAN

ELECTRICAL LABORATORY.

Columbus and neighboring towns have many electrical plants of different systems which welcome visiting students. It is also usual to make an inspection trip to one or more of the cities of the State to visit manufacturing establishments and other points of electrical interest.

The Electrical Hall was built in 1889 by a special appropriation of the Legsliature, and is occupied entirely by the Department of Electrical Engineering. It is a two-story brick building about seventyfive by fortyfive feet. In the first floor, sixty feet are taken up by the dynamo room, which is well lighted and has an asphalt floor, laid on concrete. The remainder of the floor is occupied with an office and apparatus room, a shop, a dark room for photography and a calibrating room arranged for the accurate and easy standardization of the instruments used in the laboratory. On the second floor are a lecture and draughting room 45 by 30 feet, a reading room and library, office, photometric, magnetic and telephone laboratories, locker room and janitor's room. The building and its equipments are valued at about fifteen thousand dollars.

6. **Electrical Engineering.** Lectures on direct and alternating circuits, dynamo machinery, transformers, accumulators and their applications. Twice a week. (First and Second Terms, third year, Course in Architecture; and fourth year, Courses in Civil, Mechanical and Mining Engineering, Industrial Arts and Manual Training.)

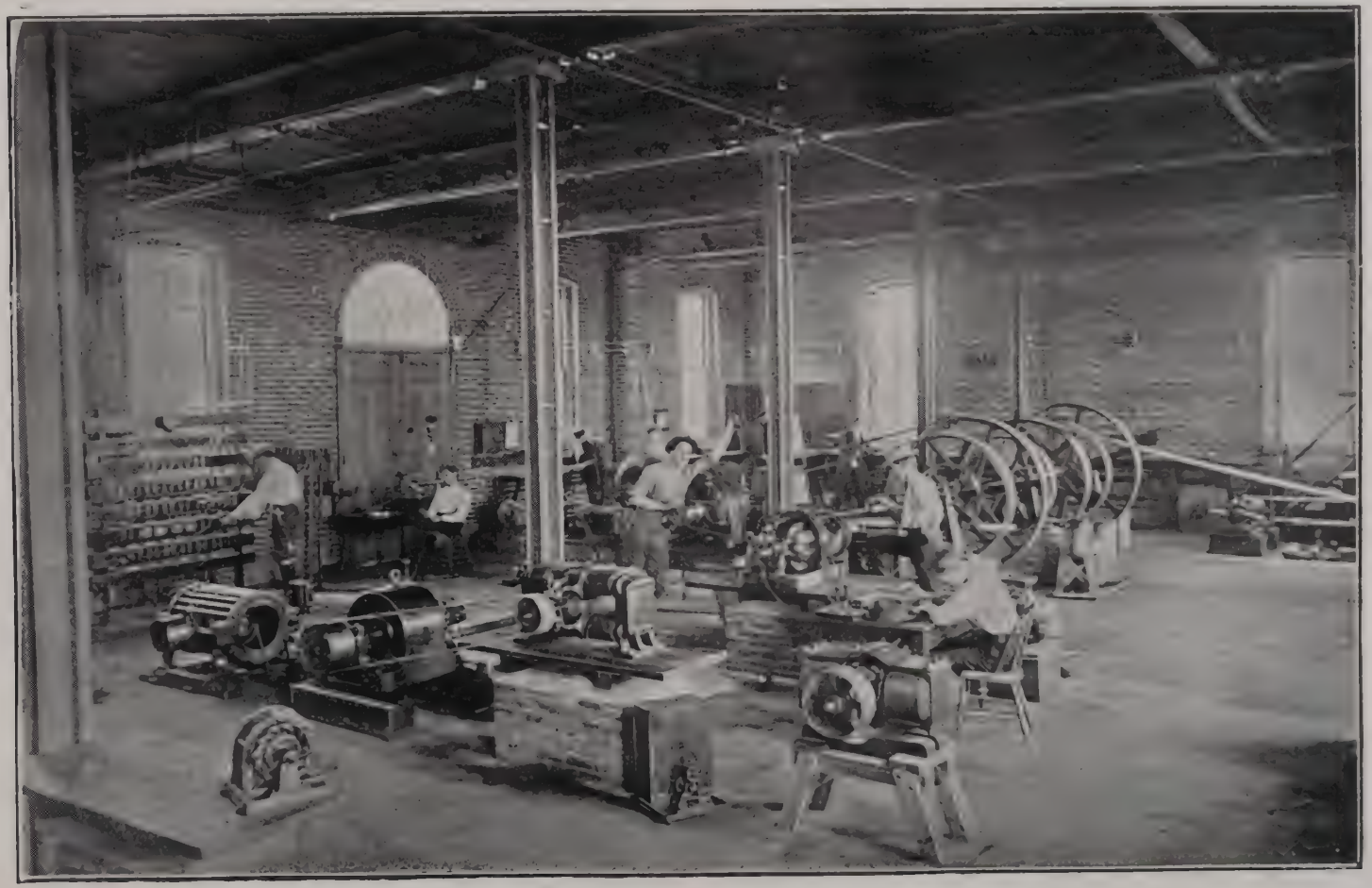
7. **Electrical Engineering.** Laboratory work on the subjects treated in Course 6, which it accompanies. Twice a week. (First and Second Terms, fourth year, Courses in Industrial Arts, Manual Training, Mining and Mechanical Engineering; Second Term, third year, Course in Architecture; fourth year, Civil Engineering.)

8. **Direct Current Dynamo Machinery.** Generators and motors, their theory, construction and operation. Lectures, recitations and problems. Four times a week. (Second Term, third year, Course in Electrical Engineering.)

9. **Elementary Dynamo Laboratory.** Handling and testing of circuits, generators, motors, accumulators, lamps, etc. Nine actual hours per week. (Third Term, third year, Course in Electrical Engineering.)

10. **Alternating Current Circuits and Machinery.** Generators, transformers, single and polyphase motors, apparatus and systems. Lectures, recitations and problems. Three times per week. (First and Second Terms, fourth year, Course in Electrical Engineering.)

11. **Advanced Dynamo Laboratory.** Continuation of the work begun in Course 9, together with alternate current apparatus, telephone apparatus, etc. (First and Second Terms, six actual hours. Third



ELECTRICAL LABORATORY

Term, with thesis work nine actual hours. Fourth year, Course in Electrical Engineering.)

12. **Electrical Transmission and Distribution.** Systems, operation and apparatus. Twice a week. (Second Term, fourth year, Course in Electrical Engineering.)

13. **Application of Electricity.** Brief treatment of the elements of illumination, street railway work, telephone, telegraph, electro-metallurgy, mining, etc. The seminary method is used in this course to the extent of each student writing one paper on some assigned subject, and reading the same before the class. Five times per week. (Third Term, fourth year, Course in Electrical Engineering.)

14. **Electrical Design.** Includes wiring of buildings, direct and alternate current generators, transformers, distribution, etc. Eight hours per week in the drawing room. (Second and Third Terms, fourth year, Course in Electrical Engineering.)

FRENCH

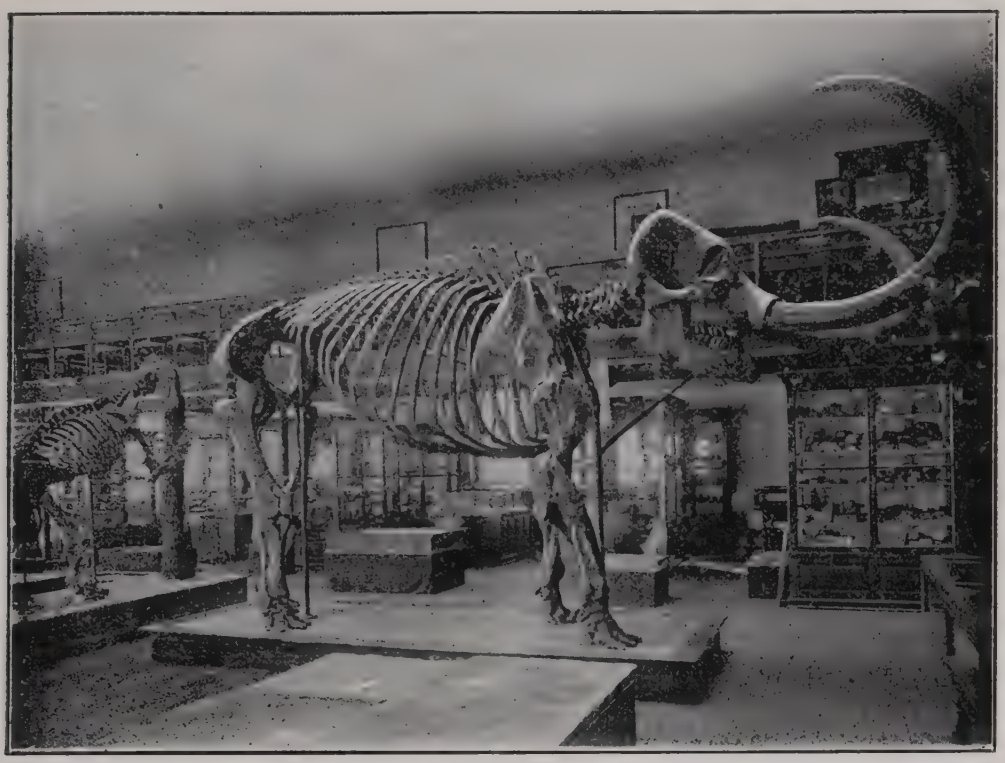
(DEPARTMENT OF ROMANCE LANGUAGES AND LITERATURES)

Office, University Hall, Room 35

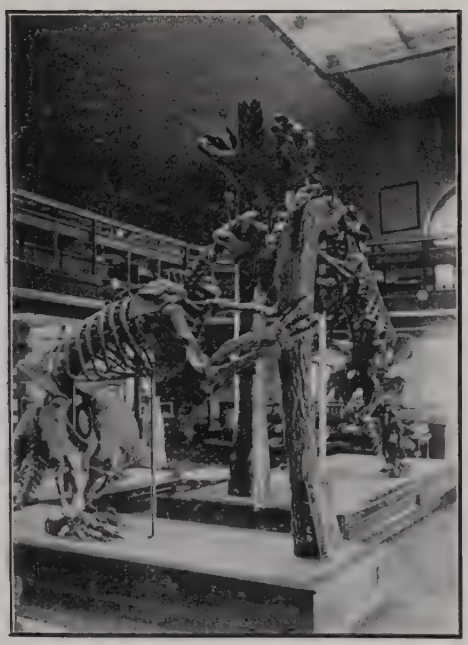
Professor Bowen, Associate Professor Bruce, Mr. Jones

1. **Elementary French.** Grammar and reader, modern prose and plays. Four times a week. (First, Second and Third Terms. Required of all students who offer partial credit in French as their entrance language. Offered as alternative with German 1 and Spanish 1 to those who enter with full or partial credit in Latin, or without previous language training.)

3. **Science Reading.** Four times a week. (First, Second and Third Terms. Open to those who have completed Course 1, or its equivalent. Required of all students who offer French as their entrance language.)



GEOLOGICAL MUSEUM



GEOLOGY

Office, Orton Hall, Room 1

Professor Prosser, Professor Bownocker

The University is able to present unusual advantages for the study of Geology. By an act of the Legislature it has been put in possession of all the collections made by the late geological survey, and these collections have been supplemented by valuable additions of fossils and minerals from various sources. The State collection embraces a very complete representation of every geological formation shown in Ohio. In its new and ample quarters the Department offers exceptionally good opportunities for work in the lithological and stratigraphical laboratories.

Orton Hall, completed at a cost of more than $100,000, is designed for the permanent accommodation of the large geological collection of the University and for work and instruction in the Department of Geology. A portion of it is occupied by the library and reading room. The building is two stories in height, with a high basement, is built of brick and faced with sandstone, and is fire-proof throughout. Some of the material was contributed by various quarries of the State of Ohio, and almost all of the finer varieties of Ohio building stone are represented in the columns, walls and ceiling panels of the vestibule. At the right of the main entrance is the geological lecture room and professor's private room. The central and rear portion is occupied by the geological and paleontological museums, while the museum of economic geology is in the basement. The laboratories of lithological and stratigraphical geology are on the second floor.

1. **Physiography.** The topographic feature of the earth's surface and the agencies producing these. The atmosphere, climate, etc. Oceans, rivers, and lakes. Recitations, lectures, map work. Five hours. (Third Term, first year, Short Courses in Mining, Clay-working; and Third Term, second year, Short Course in Industrial Arts.)

2 **General Geology.** Structural, historical and dynamical geology. Three hours lectures and recitations, and four hours laboratory and field work. In the laboratory Dana's Manual of Geology, the Ohio Geological Reports and characteristic fossils will be studied. In the field, specimens will be collected, sections measured, formations identified and the student given an idea of the methods of work pursued by a field geologist. Credit five hours. (First Term, fourth year, Courses in Architecture, Ceramics, Civil and Mining Engineering; and second year, Short Course in Clay-working.)

4. **Elementary Geology.** Recitations, lectures, laboratory work. Lithological, dynamical, structural and historical geology. Five hours. (Second Term, second year, Short Course in Mining.)

6. **Economic Geology.** Lectures and assigned reading. Economic materials of stratified rocks, — clays, limes, cements, coals, iron ores, phosphates, petroleum and gas. Economic materials derived from unstratified rocks — gold, silver, copper, mercury, etc. Three hours. (Second Term, fourth year, Courses in Architecture, Ceramics, Civil and Mining Engineering; and second year, Short Course in Clay-working.)
7. **Petrography.** Lectures and laboratory work. The igneous, sedimentary, and metamorphic rocks, — their origin and classification. The volcanic rocks of the western United States, — their composition, structure and alteration products. The object of this course is to give the student a practical acquaintance with rocks. Two hours. (Second Term, fourth year, Course in Mining Engineering.)

GERMAN

(DEPARTMENT OF GERMANIC LANGUAGES AND LITERATURES)

Office, University Hall, Room 30

Professor Eggers, Associate Professor Mesloh, Mr. Eisenlohr, Mr. Moore, Miss Barrows

1. **Elementary German.** Four times a week. (First, Second and Third Terms. Required of all students who offer partial credit in German as their entrance language. Offered as alternative with French 1 and Spanish 1 to all students who enter with full or partial credit in Latin, or without previous language training.)
2. **Science Reading.** Four times a week. (First, Second and Third Terms. Open to those who have completed Course 1 or its equivalent. Required of all students who offer German as their entrance language.)

HISTORY

(DEPARTMENT OF AMERICAN HISTORY AND POLITICAL SCIENCE)

Office, University Hall, Room 15

Professor Knight, Mr. Tuttle

1. **Political History of the United States.** Lectures, text-books and prescribed reading. Hart's *Formation of the Union;* Wilson's *Division and Re-Union.* (Two times a week. Second Term: four times a week. Third Term, third year, Courses in Industrial Arts and Manual Training.)

INDUSTRIAL ARTS

Office, Hayes Hall, Room 2

Professor Sanborn, Mr. Knight, Mr. Renck, Mr. Crowe

The shops, which occupy the north wing of Hayes Hall, afford excellent facilities for instruction in both the practical details and the underlying principles of carpentry, pattern–making, forging, moulding, foundry work and machine work.

The carpenter and pattern shop is equipped with twenty–five benches with complete sets of carpenter tools for each and a large number of special tools for general use, twenty–three pattern–maker's turning lathes, with cupboards containing the necessary turning and pattern–making tools under each, an 8 foot pattern–maker's lathe with compound rest, a pony planer, a buzz planer, a circular rip and crosscut saw, a scroll saw, a trimmer and a power grindstone.

The forge shop is equipped with twenty stationary forges, with anvils and tools for each, a heating forge, a portable hand forge, a foot–power hammer, a blacksmith's drill and punch, shear and bar cutter. The blast for the forges is furnished through under–ground piping by a 45–inch Buffalo pressure blower, and the smoke is removed by a 55–inch Buffalo exhaust fan overhead. Both of these fans are driven by a 15 horse–power electric motor.

The foundry is equipped with a 24–inch Colliau cupola, the blast for which is furnished by a 30–inch Buffalo blower; two brass furnaces, one 16 inches in diameter and the other 20 inches in diameter; a core oven, benches for iron and brass moulding, core–making and cleaning of castings, a space for floor moulding 30 feet by 40 feet, besides all the necessary moulding tools, flasks, crucibles, ladles, tongs, etc.

The machine shop is driven by a 30 horse–power electric motor from above, and is equipped with the following tools: Twenty–eight benches for vise work, with complete sets of tools; eight speed lathes, sixteen engine lathes, a Fox monitor turret lathe, two planers, two shapers, a milling machine, an upright drill, a sensitive drill, grinding machines for both plane and cylindrical surfaces, tool grinders, emery wheels, etc. This machinery is furnished with all the necessary tools, and the tool–room is equipped with full sets of drills, taps, dies, milling cutters, standard plugs, guages, threads, micrometers and a great variety of special tools.

Hayes Hall is a large building of pressed brick and brown sandstone, completed and equipped at a cost of about $70,000. It is devoted to instruction in Industrial Arts, Drawing, Civil Engineering, Mechanical Engineering and Domestic Science. The central portion is three stories high and the front wings are two stories each. On the

INDUSTRIAL DEPARTMENT — MACHINE SHOP

first floor are two offices, the rooms of the Department of Domestic Science and two lecture rooms; besides the machine shop, the forge shop and the foundry. On the second floor are the carpenter and pattern shops, and the Department of Civil Engineering, with private rooms annexed. The Department of Drawing occupies the third floor for instruction in mechanical and free-hand drawing and photography.

1. **Tools and Machines.** Lectures and recitations on hand and machine tools and the principles underlying their construction and operation, and materials used in construction. Three times a week. (First, Second and Third Terms, third year, Courses in Industrial Arts and Manual Training; and second year, Short Course in Industrial Arts.)

2. **Designing.** Problems in design, to accompany Course 1. Three times a week. (Second and Third Terms, third year, Courses in Industrial Arts and Manual Training.)

3. **Shop Equipment, Appliances and Management.** A continuation of Course 1. Lectures and recitations on the strength and durability of the materials used in construction; shop and factory buildings and their construction; power, power transmission and prime movers; automatic machines and other special devices for turning out cheap and accurate work; methods of compensation and shop accounts and management. Three times a week. (First, Second and Third Terms, fourth year, Course in Industrial Arts.)

4. **Advanced Designing.** Problems in the design of buildings and the arrangement of machinery, line-shafting, etc., for manufacturing plants; to accompany Course 3. Three drawing periods a week. (First, Second and Third Terms, fourth year, Course in Industrial Arts.)

5. **Workshop Appliances.** Lectures and problems on the construction of shop buildings and the arrangement of machinery; power required and the means of transmission; friction in line-shafting and the efficiency of machinery; automatic machines and special shop appliances. Three times a week. (Third Term, fourth year, Course in Mechanical Engineering.)

7. **Machine Design.** Practical application of the principles of machine design. Three periods a week. (Third Term, third year, Course in Electrical Engineering.)

MATHEMATICS

Office, University Hall, Room 45

Professor Bohannan, Associate Professor McCoard, Associate Professor Boyd, Assistant Professor Arnold, Assistant Professor Swartzel, Mr. Rasor, Mr. Travis, Mr. Moore, Mr. Davis

1. **Elementary Algebra.** Venable. Five times a week. (First Term, first year, Short Course in Clay-working.)

2. **Elementary Algebra.** Wentworth. Five times a week. (First Second and Third Terms, first year, Short Courses in Mining and Industrial Arts.)

3. **Plane Geometry.** Venable. Five times a week. (First Term, first year, Short Courses in Mining and Industrial Arts.)

3a. **Plane Geometry.** Venable. Five times a week. (Second Term, first year, Short Course in Clay-working.)

11. **Differential Equations.** Edwards. Once a week. (First Term, third year, Course in Mechanical Engineering.)

13. **Solid Geometry.** Venable. Five times a week. (Second Term, first year, Short Courses in Mining and Industrial Arts.)

14. **Plane Trigonometry.** Loney. Five times a week. (First Term, first year, all four-year Courses; Third Term, first year, Short Courses in Mining and Industrial Arts.)

15. **Analytical and Spherical Trigonmetry.** Loney, with notes on Spherical Trigonometry. Twice a week. (Second Term, first year, all four-year courses.)

16. **College Algebra.** Taylor. Three times a week. (Second Term, first year, all four-year courses.)

17. **Plane Analytics.** Loney. Five times a week. (Third Term, first year, all four-year courses.)

18. **Analytics and Differential Calculus.** Loney. Venable. Edwards. Five times a week. (First Term, second year, Courses in Architecture, Ceramics, and Civil, Electrical, Mechanical and Mining Engineering.)

19. **Differential Calculus.** Edwards. Five times a week. (Second Term, second year, same as 18.)

20. **Integral Calculus.** Edwards. Five times a week. (Third Term, second year, same as 18.)

MECHANICAL ENGINEERING

Office, Hayes Hall, Room 11

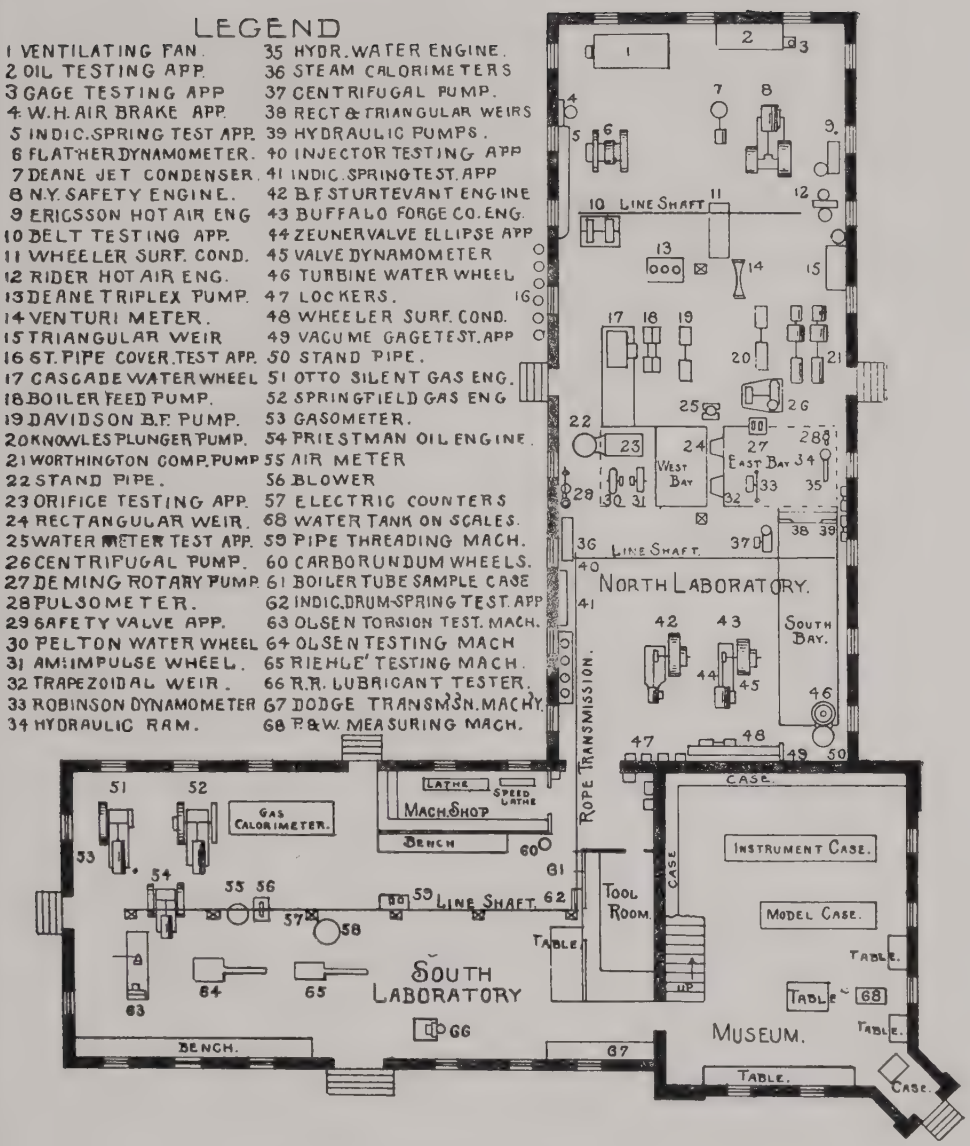
Professor Magruder, Professor Hitchcock, Mr. Frost

The lectures and recitations of this Department are held in rooms Nos. 11 and 12 of Hayes Hall, and in the lecture room of the Mechanical Hall. Mechanical Hall is a brick building, 93 feet front by 32 feet deep, with a wing 32 by 80 feet. The lecture room is on the second floor, and is also provided with drawing tables. The main floor has three large rooms. The Museum is fitted with glass cases for delicate apparatus, measuring machines and other instruments of precision, samples of engineering supplies and specimens of materials which have been tested and broken either in the laboratory or in practice; and also a collection of models of mechanisms and valve gears.

The south laboratory is used for applied mechanics and for gas engineering. Here are located the machines for testing the strength and elasticity of engineering materials, and recording their physical properties automatically and autographically. Oils are tested as lubricants.

The gas engine plant has three engines, using gas, gasoline or oil. These illustrate three methods of ignition, and fly ball and inertia governors. The air may be supplied by a fan through a large meter. Temperatures and pressures of air, gas and water are measured. The fresh and burnt gases are analyzed and their heating values determined by a calorimeter. The power is measured with both the indicator and the brake. The laboratory machine shop and tool room are in this room.

The north laboratory is used as a steam engineering and hydraulic laboratory. Three 35-horse-power engines give facilities for testing single or twin, condensing or non-condensing, simple or compound, throttling or automatic cut-off, engines using either a jet or a surface condenser. Pressure and vacuum gauges are calibrated. Indicator springs of five makers are tested both cold and hot. Five kinds of calorimeters determine the moisture in steam before and after passing three different separators. Injectors are tested for lift, quantity, pressure and steam consumption. Simple and compound steam pumps of six makes (ranging to 1200 gallons per minute capacity), two centrifugal, a triplex power and a rotary pump, are available for testing. They deliver water at pressures up to 150 pounds to two stand-pipes. These in turn supply turbine, Cascade, Pelton and American impulse water wheels, and also enable experiments to be made on the flow of water through orifices, pipes, valves, etc. Three cisterns, provided with a variety of weirs up to five feet wide, give practice in measuring flowing water. A Venturi meter and Pilot tubes are also used. Ericsson and Rider



GROUND PLAN

OF

EXPERIMENTAL ENGINEERING LABORATORY.

hot air engines are tested. A Rife hydraulic engine, a Humphryes ram, Gem and Eureka water motors, and a pulsometer, are included in the hydraulic apparatus, all of which are connected and prepared for complete tests.

A complete set of Westinghouse air-brake apparatus, a blower and a ventilating fan, enable experiments to be performed in the flow of air, which are supplemented by tests of the heating and ventilating plants in the buildings on the campus. Belts and pulleys are tested for their slippage, friction and horse-power transmitted.

The Robinson experiment boiler (for full description see page 98) gives unexcelled facilities both for laboratory exercises in the use, care and testing of steam boilers, and for the solution of original problems in this branch of enginering practice and research.

In addition to the apparatus and equipment of the power plant of the University (for description see page 96), the power house at Townshend Hall contains a horizontal, return tubular boiler, two steam engines and a 6-ton ammonia compression refrigerating machine fitted up with thermometers and an ammonia meter, and prepared for making complete tests, thereby making the facilities on the campus for engineering testing quite complete. Machinery, apparatus and appliances are continually being presented, built or purchased, and the student is given an opportunity to test everything under the practical conditions of operation. Besides the laboratory facilities, opportunities frequently arise to test machinery, engines or boilers in the city, and in these tests the students take part.

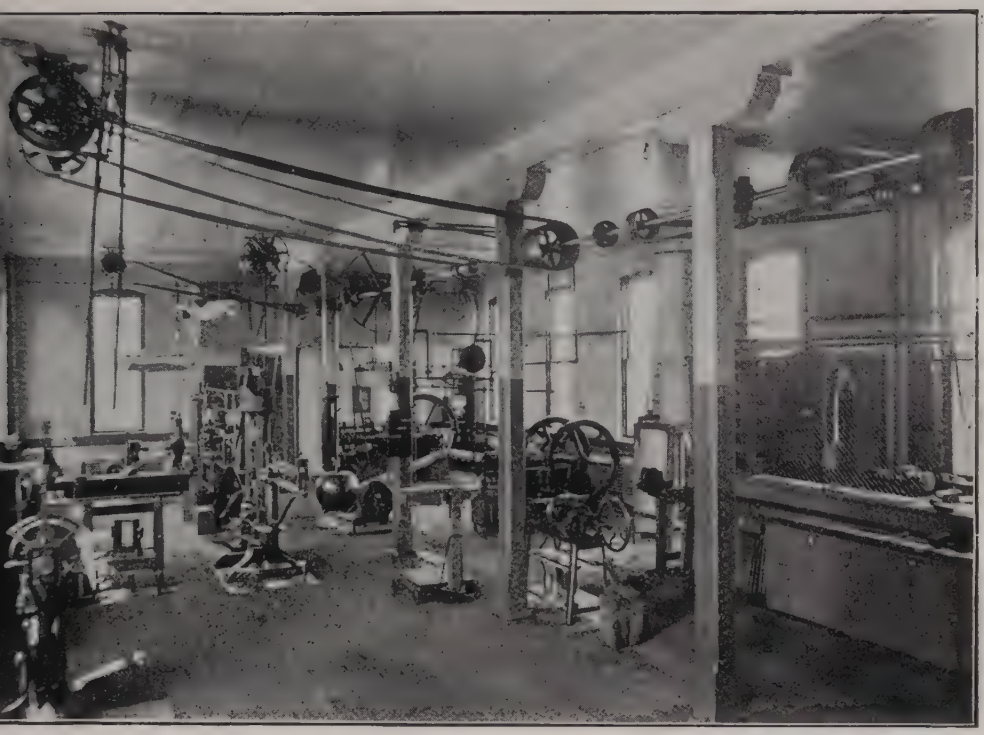
3. **Mechanism.** Lectures and recitations on the principles of mechanism and mechanical movements. Five times a week. (Second Term, third year, Electrical and Mechanical Engineering Courses.)
   The accurate laying out of movements, embodying the principles of mechanism. Twice a week. (Third Term, third year, Course in Mechanical Engineering.)

6. **Analytical Mechanics.** Five times a week. (First and Second Terms, third year, Courses in Architecture, Ceramics, and Civil, Electrical, Mechanical and Mining Engineering.)

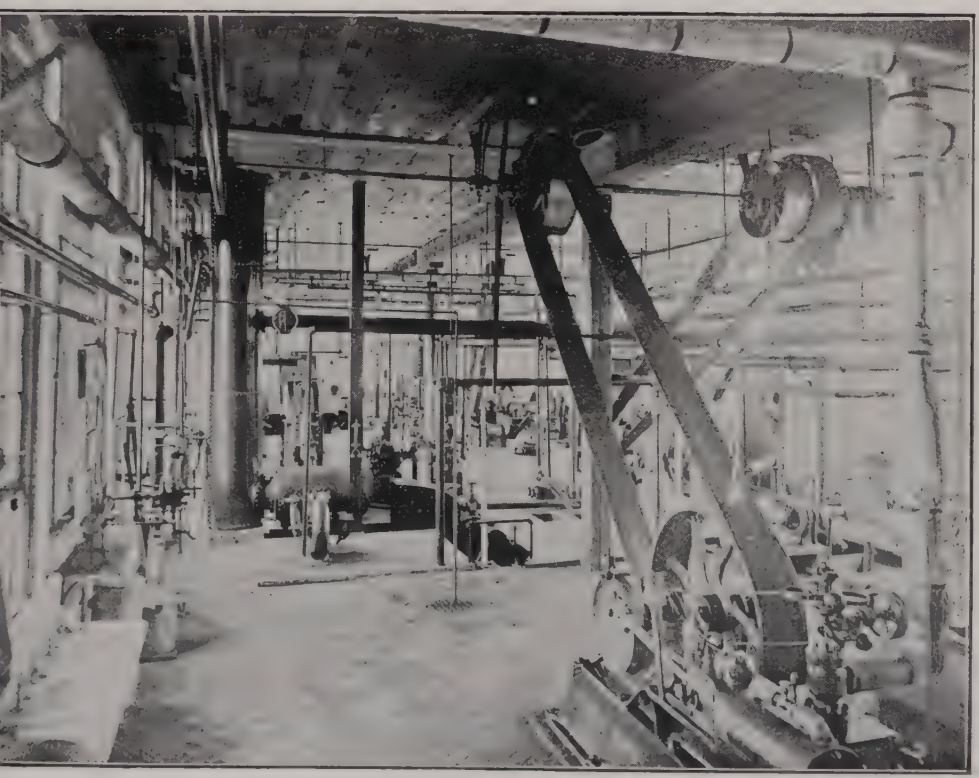
7. **Strength of Materials.** Recitations and lectures on the elastic and ultimate resistance of the materials of engineering to stress and their use in structures and machines. Lectures on elementary hydraulics and the flow of water through orifices and pipes, over weirs, and in streams, and on measuring the same. Five times a week. (Third Term, third year, same as 6.)

12. **Experimental Engineering Laboratory.** Twice a week. (First Term, third year, Course in Mechanical Engineering.)

14. The same. Four times a week. (Second Term, fourth year, Course in Mechanical Engineering.)



EXPERIMENTAL ENGINEERING LABORATORY
GAS ENGINES AND TESTING APPARATUS



EXPERIMENTAL ENGINEERING LABORATORY
STEAM ENGINES AND HYDRAULIC MACHINES

15. The same. Three times a week. (Third Term, fourth year, Course in Mechanical Engineering.)

17. The same. Three times a week. (Second Term, fourth year, Course in Civil Engineering.)

Courses 12, 14, 15, 17, 24, 25, 27, 28, 29 and 30 in the Experimental Engineering Laboratory, are arranged to meet the needs of the different students in obtaining experimental practice in the use and calibration of accurate measuring instruments; in testing illuminating and lubricating oils for friction, endurance, and the like; in the calibration and adjustment of gauges and springs; in testing the strength and elasticity of the materials of construction in tension, compression, torsion, flexure, shear and impact, in the flow of liquids and gases; in the use of the steam engine indicator and transmission and absorption dynamometers; in testing of steam separators, injectors, steam pipe coverings; belt, rope and chain gearing; in setting valves and eccentrics; in making efficiency tests of simple and compound, condensing and non-condensing steam engines; of steam boilers and complete power plants; of gas and hot air furnaces; of pulsometer, steam, and centrifugal pumps; of hydraulic rams and of impulse and turbine water wheels.

18. **Machine Design.** Recitations on Unwin's Machine Design, with lectures on American practice. Five times a week. (First and Second Terms, fourth year, Course in Mechanical Engineering.)

19. **Machine Design.** Practical applications of the principles of machine design. Five drawing periods a week. (Third Term, fourth year, Course in Mechanical Engineering.)

21. **Thesis Work.** Five times a week. (Third Term, fourth year, Course in Mechanical Engineering.)

22. **Timber and Masonry.** Lectures on the construction of foundations and structures in timber and masonry. Five times a week. (The last three-fifths of Second Term, third year, Courses in Mechanical Engineering and Industrial Arts.)

23. **Materials of Construction.** Lectures on the materials used in architectural and building construction, and laboratory exercises on their properties. Four times a week. (First Term, fourth year, Course in Architecture.)

24. **Experimental Engineering Laboratory.** Three times a week. (First and Second Terms. Elective to third and fourth year engineers.)

25. The same. Five times a week. (Third Term, fourth year, Courses in Ceramics and Civil and Mining Engineering.)

27. The same. Five times a week. (First term, fourth year, Course in Mechanical Engineering.)

28. The same. Twice a week. (Third Term, third year, Course in Electrical Engineering; First Term, fourth year, Course in Industrial Arts; and Third Term, Course in Manual Training.)

29. The same. Three times a week. (First Term, fourth year, Course in Electrical Engineering.) Twice a week. (Second Term, fourth year, Course in Industrial Arts.)

30. The same. Twice a week. (Second Term, fourth year, Course in Electrical Engineering; Third Term, fourth year, Course in Industrial Arts.)

31. **Hydraulic Machinery.** Recitations and lectures on pumping machinery. Three times a week. (Third Term, fourth year, Course in Mechanical Engineering.)

32. **Mechanical Engineering of Power Plants.** A descriptive study of steam and gas engines, boilers, pumps, injectors and other machinery used in plants generating power. Five times a week. (Third Term, third year, Courses in Electrical and Mechanical Engineering and Industrial Arts. Third Term, fourth year, Courses in Manual Training.

33. **Steam Engines and Boilers.** A detail study of steam using and steam generating machinery. Five times a week. (First Term, fourth year, Courses in Electrical and Mechanical Engineering.)

34. **Thermodynamics.** Lectures and recitations on the transmutations of heat and mechanical energies in steam, gas and air engines, and in air and ammonia compressors, together with a study of the tests of ideal and actual engines and of their indicator diagrams; the flow of gases through pipes and orifices. Five times a week. (Second Term, fourth year, Course in Mechanical Engineering.)

METALLURGY

(DEPARTMENT OF METALLURGY AND MINERALOGY)

Office, Chemical Hall, Room 5

Professor N. W. Lord, Mr. Somermier, Mr. Ford

The Department of Metallurgy and Mineralogy occupies the eastern part of Chemical Hall. In the basement are the smelting furnaces, the assay laboratory, a room for rough work, and store rooms for supplies. On the first floor is the lecture room of the professor in charge, a laboratory with desks for sixteen students, a store room, a balance room, a private laboratory and an office.

The metallurgical laboratory has all the appliances for the most modern methods of technical analysis as practiced in iron and steel laboratories, including gas analysis. A large room in the basement is fitted for gold and silver assaying, with improved muffle and melting furnaces, sampling apparatus and assay balances.

The lecture room in metallurgy has a projection lantern with a large collection of views of machines, mines, and furnaces. There is a photographic room with blue-printing facilities, where students learn to make copies of the drawings used in illustrating the lectures.

A collection of minerals and rocks with a large set of rock sections is provided for illustrating the mineralogy, as well as sets of blow-pipe apparatus for the students in determinative mineralogy.

2. **Mineralogy.** Lectures arranged so as to be preparatory to Determinative Mineralogy (Course 3). Three times a week. (Third Term, second year, Courses in Chemistry and Mining Engineering, and third year, Course in Ceramics.)

3. **Determinative Mineralogy.** Laboratory Course in practical determination of minerals by physical and chemical tests. Each student is furnished with a set of apparatus, and works under an instructor's inspection. Brush's Determinative Mineralogy is used as a manual. Five times a week. (Third Term, third year, Course in Mining Engineering.)

4. **Metallurgy.** A course of lectures upon fuel and its uses, iron and steel, copper, lead, gold and silver, their properties, tests, ores and details of the models of reduction. The lectures are supplemented by a careful study of references to standard works and journals. Five times a week. (First and Second Terms, third year, Courses in Mechanical and Mining Engineering and Industrial Arts; and fourth year, Course in Chemistry. First Term, fourth year, Course in Ceramics.)

ASSAY LABORATORY

5. **Metallurgical Laboratory.** Lectures and laboratory work. Laboratory practice in the analysis of iron and steel, fuel and slags, and the assay of lead, copper and zinc ores by wet methods, using approved methods as practiced in technical laboratories of metallurgical works. Course 5 must be preceded by Chemistry 7. Five laboratory periods a week. (First, Second and Third Terms, second year, Course in Mining Engineering; First and Third Terms, third year, Course in Chemistry.)

6. **Assaying.** Laboratory work. Practical work in the assaying of gold, silver and lead ores, by furnace methods. Five laboratory periods a week. (Second Term, third year, Course in Mining Engineering and Chemistry.)

7. **Metallurgical Construction.** Practice in the designing of furnaces and other metallurgical machinery, including detail drawings and estimates. Three times a week. (Second Term, fourth year, Course in Mining Engineering.)

8. **Ore Dressing and Coal Washing.** Lectures. Instruction in the methods of concentrating and enriching ores and fuels by mechanical means. Lectures with reference to standard books and various papers in technical journals. Twice a week. (First Term, fourth year, Course in Mining Engineering.)

9. **Mineral Chemistry.** Lectures upon fire-damp, mine explosions, explosives, boiler waters, poisonous gases, iron ores; iron and steel, their properties and modes of manufacture; coal and coke. Five hours a week. (Third Term, second year, Short Course in Mining.)

MILITARY SCIENCE AND TACTICS

Office, Armory Room

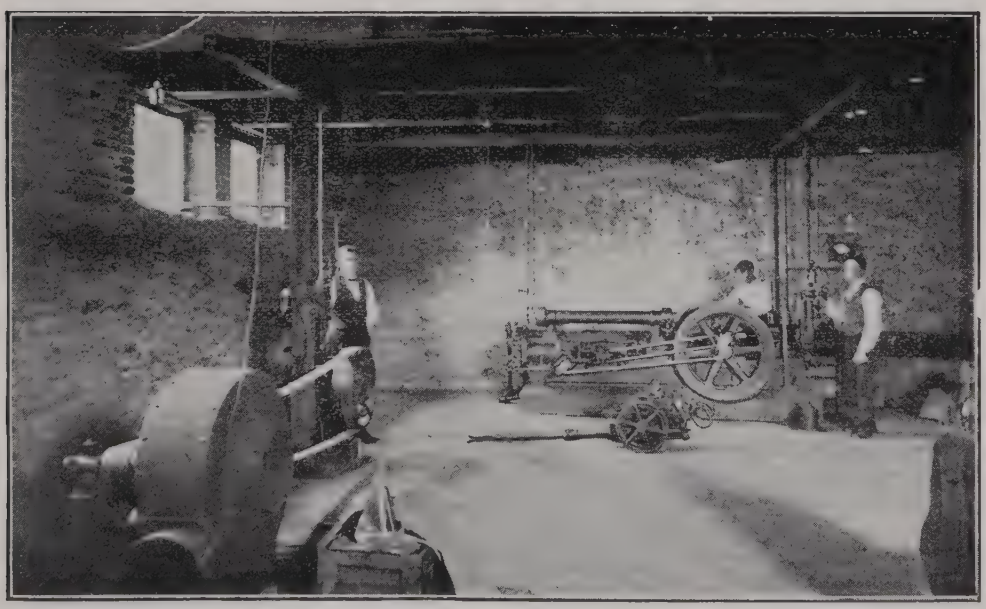
Captain George L. Converse, U. S. A.

1. **Military Drill.** Four times a week, from the opening of College till the Thanksgiving vacation; twice a week from Thanksgiving till April first; four times a week till the close of the school year. Required of all able-bodied male students during first and second years of their course.

2. **Tactics.** Lectures and recitations. Twice a week. (Second Term.)

3. **Art of War.** Lectures and recitations. Twice a week. (Second Term.)

LABORATORY FOR METALLURGICAL CHEMISTRY



MINING ENGINEERING LABORATORY — FANS AND COMPRESSOR

MINE ENGINEERING

Office, Chemical Hall, Room 29

Professor Ray

This Department is equipped with all of the latest improved instruments and apparatus used in mine engineering, surveying and the study of mine ventilation. There is a collection of models of mine machinery and supplies, to which additions are being made which are valuable as illustrations. The draughting room is large, well lighted and provided with a desk for each student, where he is personally taught map making and the platting of actual surface and underground surveys; the making of tracings of drawings, and how to make blue-prints. He is also taught proper methods of keeping notes and all records necessary to an efficient engineer's office. The students are given practical experience by making actual surveys of coal mines and in working up their notes complete in all of the necessary details. The students are also taught how to make working drawings, plans, estimates and specifications of mining operations and equipment.

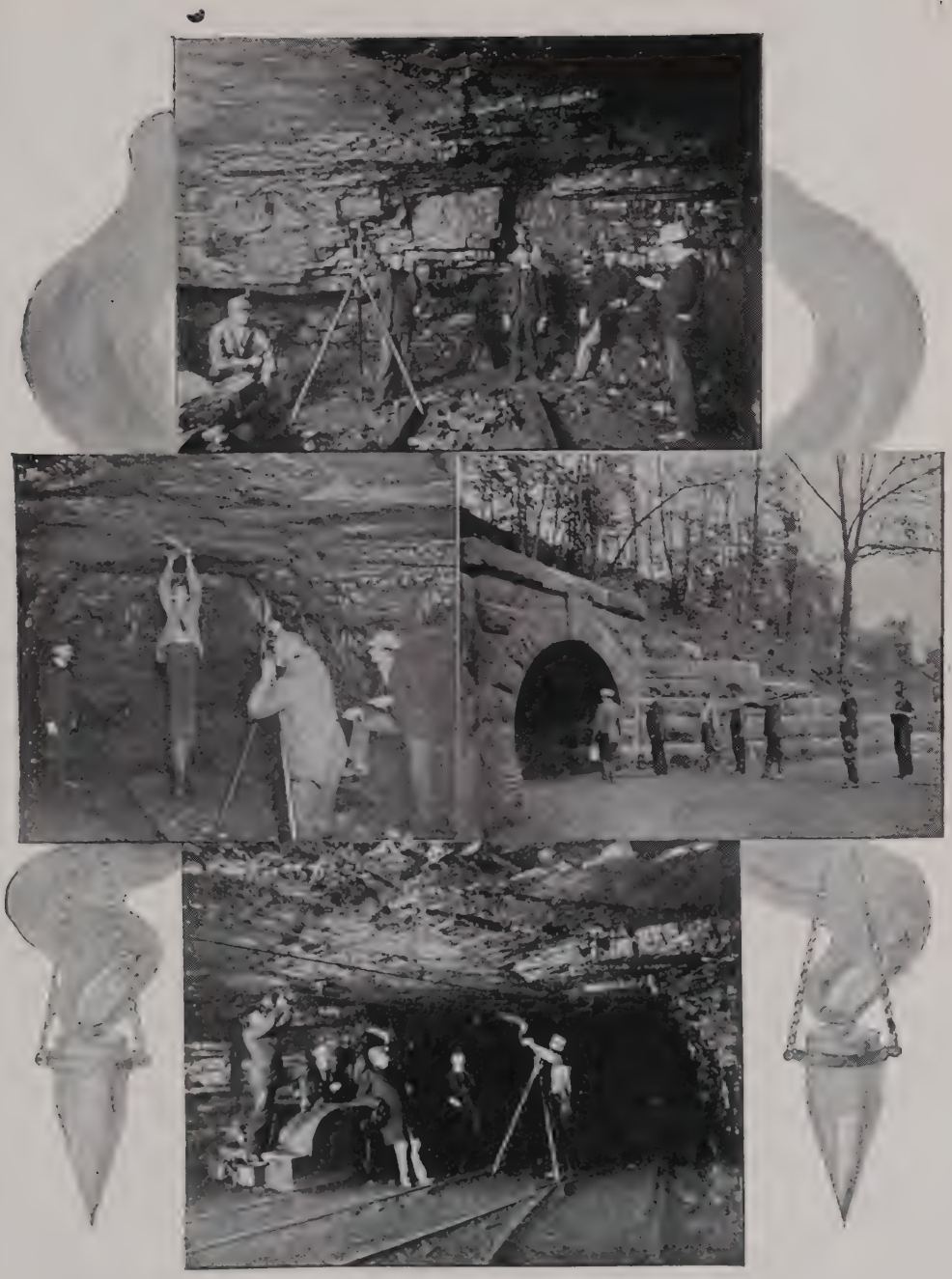
There is a large collection of views of machines, mines and mine equipment for use in the projection lantern in the lecture room. A photographic room with blue-printing facilities is used by the students in making copies of their own drawings and those illustrating the lectures.

The Mining Engineering Course pays special attention to underground surveying, mapping, timbering, ventilation and other matters relating to safety and speed, system and method in extracting coal and other minerals.

The coal mines of central Ohio are easily accessible to the University and furnish an extremely valuable field for illustrating the practical systems and methods of mine surveying, systems of mining, timbering, haulage, drainage and ventilation, tipple construction and general arrangement of mining plants.

During their course the mining students are required to make frequent trips and to spend sufficient time at the mines in actual work and observation to become familiar with practical mine surveying and the details of mine equipment and management. This work is further supplemented by visits to shops or public works, which afford practical illustrations of engineering work in the process of construction.

1. **Mine Surveying.** Lectures and field practice. This is similar to Course 4, but more elementary. The same text is used. The students have more practice in the drawing room. Five times a week. (First Term, second year, Short Course in Mining.)



CLASS IN MINING ENGINEERING AT WORK SURVEYING IN COAL MINE

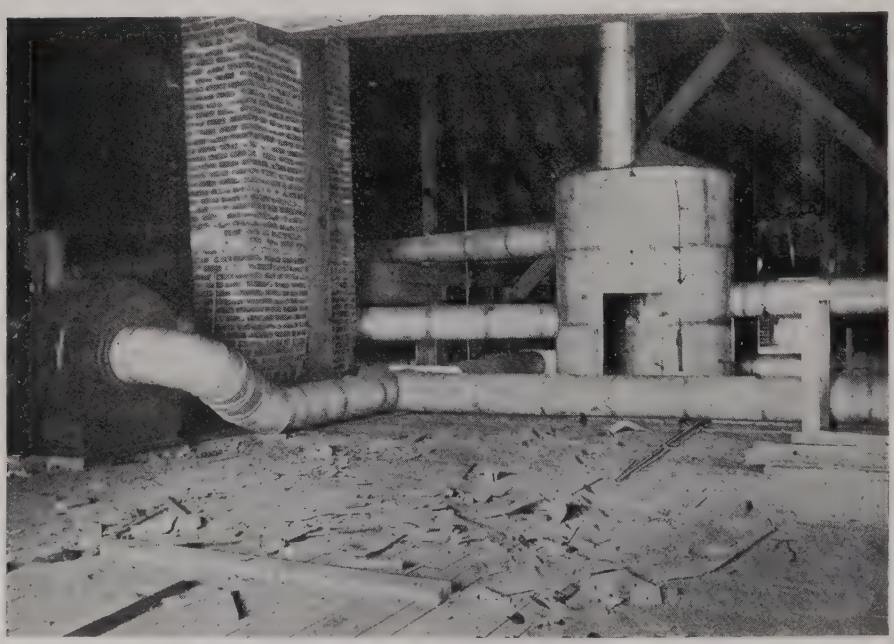
2. **Ventilation and Haulage.** Lectures illustrated by experiments and maps of mines and models when possible, tests by safety lamps and anemometers, and methods of air distribution in coal mines. Five times a week. (Second Term, second year, Short Course in Mining.)

3. **Mine Operating.** A course of lectures and practical instruction in mine book-keeping and accounts, cost of working, etc., particularly adapted to Ohio coal mining. Five times a week. (Third Term, second year, Short Course in Mining.)

4. **Mine Surveying.** Field practice in the use of instruments for surface and underground surveys. Full notes are taken and maps and plans made in the drawing room. Davies's Surveying, by Van Amringe, is used as a text-book. Five times a week. (First Term, third year, Courses in Mining Engineering and Ceramics.)

5. **Mine Engineering.** Lectures. Mine operating, mining machinery, ventilation, shaft-sinking, working out deposits, etc. Constant reference is required to the standard works and to the leading technical journals, with practice in designing mine plants, draughting and estimates. Five times a week. (First, Second and Third Terms, fourth year, Course in Mining Engineering.)

6. **Plans and Specifications.** Five times a week. (Third Term, fourth year, Course in Mining Engineering.)



APPARATUS FOR MEASUREMENTS IN VENTILATION.

PHYSICS

Office, University Hall, Room 13

Professor Thomas, Mr. Kester, Mr. Brooks

The Department of Physics occupies the west half of the first two floors and basement of University Hall. The first floor rooms are the principal lecture room, fifty–five by thirty–eight feet; the elementary lecture room; an instrument room; and the office of the Department.

On the second floor are rooms for elementary laboratory work, and a dark room for photographic work, in connection with spectrum and Roentgen–ray apparatus. The lecture room on the first floor is also used in laboratory work. In the basement, provision is made for advanced exercises in electricity, heat, etc. The basement plan on an adjoining page gives a general idea of its arrangement, and of the character of the work provided for.

The Department has an excellent equipment of apparatus, to which additions are constantly being made. The apparatus includes a large collection of pieces for illustration of the general lecture room work, but is principally chosen for accurate measurement in the laboratory. A set of standards of length, capacity and mass, sent under the act of Congress supplying such sets to the several agricultural colleges, is in the possession of the Department. The pieces are copies of the United States standards made by the Coast Survey at Washington.

Among the principal pieces of apparatus are a dividing machine by Fauth & Co.; chronometers by Parkinson & Frodsham and by Negus, the latter a break–circuit; a chronograph by Fauth & Co.; a Hipp's chronoscope; cathetometers by Salleron and by the Geneva Society, the latter an exceptionally fine instrument; Regnault's apparatus for vapor tension, for expansion of gases and for specific heat; Melloni–Tyndall apparatus for radiant heat; standard thermometers by Baudin and others; Rutherford and Rowland diffraction gratings; Rowland's spectrum photographs, spectroscopes by Brashear, Browning, Apps and others; Salleron's complete apparatus for projections in polarized light; lanterns for projections by the lime light and the arc light; a variety of sound apparatus from Koenig; portable and quadrant electrometers; Kelvin galvanometers of high and low resistance; Wiedemann, Kohlrausch and other galvanometers; standard resistance coils, with Cavendish laboratory certificate; several sets of resistance coils and bridges; a Kew magnotometer; Kelvin Standard balances; Weston Ammeters and voltmeters; standards of self–induction; standard battery cells; photometric standards and photometers; X–ray apparatus, etc.

Under the laws of Ohio, the professor of Physics is ex-officio State Sealer of Weights and Measures, and all of the standard weights, measures and balances received from the United States government are in the rooms of the Department.

1. **Elementary Physics.** Recitations and experimental lectures. Five times a week. Text: Carhart & Chutes' "Elements of Physics." (First and Second Terms, first year, Short Courses in Mining and Clay-working; and second year, Short Course in Industrial Arts.)

2. **Mechanics and Heat. Electricity and Magnetism, Sound and Light.** Lectures and recitations. Three times a week. (First Second and Third Terms, second year, all four-year courses.)

3. **Physics.** Extension of Course 2, with practice in solution of problems. Twice a week. (First, Second and Third Terms, second year, Courses in Electrical Engineering, Ceramics, Industrial Arts and Manual Training.)

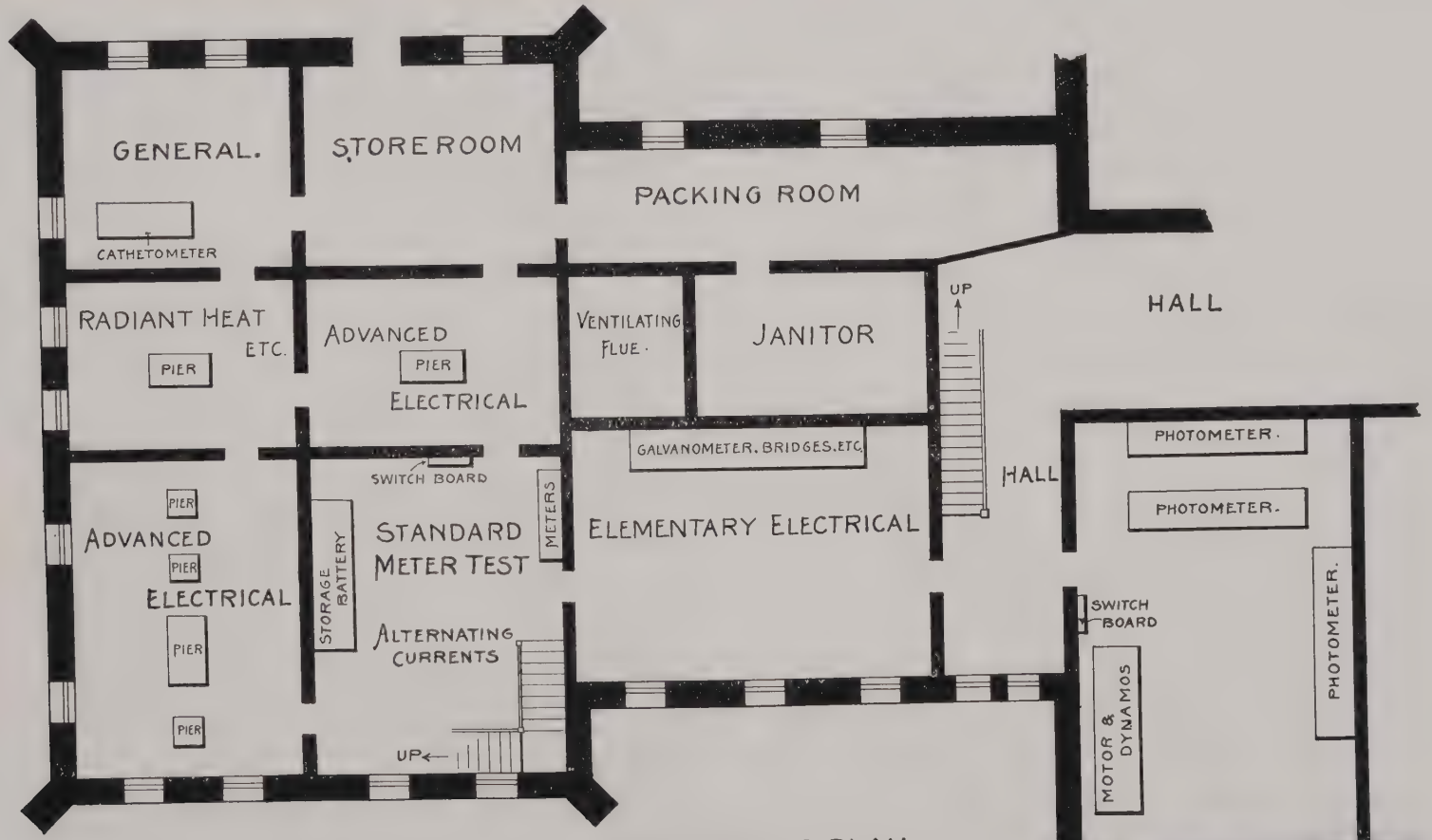
4. **Electricity and Magnetism.** Lectures and recitations. Three times a week. (First Term, third year, Course in Electrical Engineering.)

5. **Physical Laboratory.** Elementary manipulation. Length, mass and time measurements. Work in density, elasticity and in heat. Four times a week. (Third Term, second year, Course in Electrical Engineering.) (Alternative with Chemistry 20 and 21. First, Second and Third Terms, third year, Course in Manual Training.)

6. **Physical Laboratory.** Theory and practice of magnetic and electrical measurement, including the testing and standardizing of instruments; conductivity of conductors; insulation, capacity and resistance of insulated conductors and cables; temperature coefficients; commercial measuring and testing instruments; strength and distribution of magnetic fields; magnetic moments, permeability; work in light, including optical constants; spectroscopy; photometry of gas, electric and other lights. Five times a week. (First and Second Terms, third year, Course in Electrical Engineering.)

7. **Physical Laboratory.** (Twice a week, Second Term, three times a week, Third Term, second year, Course in Mechanical Engineering.) Three to five hours a week. First, Second and Third Terms, General Elective.

9. **Physical Laboratory.** A second year's work in Physical Laboratory. Three to five hours a week. Course 9 must be preceded by Course 6 or Course 7. Elective.



BASEMENT PLAN

DEPARTMENT OF PHYSICS.

VIEW IN LABORATORY FOR FIRST YEAR STUDENTS IN CHEMISTRY.

PHYSIOLOGY

(DEPARTMENT OF ANATOMY AND PHYSIOLOGY)

Office, Biological Hall, Room 12

Professor Bleile, Assistant Professor Morrey, Mr. Dresbach

8. **Bacteriology.** One lecture, one laboratory period a week. (Second Term, fourth year, Course in Chemistry.)

POLITICAL SCIENCE

(DEPARTMENT OF AMERICAN HISTORY AND POLITICAL SCIENCE)

Office, University Hall, Room 15

Professor Knight, Mr. Tuttle

11. **Political Institutions of the United States.** Lectures and recitations. A study of the origin and nature of the political institutions of the United States, and an analysis of the form and powers of

the government. Bryce's *American Commonwealth;* Burgess's *Political Science.* Three times a week. Open only to students who have had American History 1. (First Term, fourth year, Courses in Industrial Arts and Manual Training.)

RHETORIC

(DEPARTMENT OF RHETORIC AND ENGLISH LANGUAGE)

Office, University Hall, Room 44

Professor Denney, Assistant Professors Graves, McKnight, Allen, Mr. Bohn, Mr. Abbott

1. **Paragraph Writing and Analysis of Prose.** Twice a week. (First, Second and Third Terms, first year, all four-year courses.)
2. **Expository Writing.** Twice a week. (First Term, second year, Courses in Industrial Arts, Manual Training, and Electrical and Mechanical Engineering; third year, Courses in Architecture, Ceramics, Chemistry, and Civil and Mining Engineering.)
3. **Brief-making and Written Argumentation.** Twice a week. (Second and Third Terms, years and courses as in 2.)

10. **Advanced Composition.** Credit one hour. Three terms.

21. **Essentials of Oral Discourse.** Once a week. (First, Second and Third Terms, first year, all four-year courses.)

SPANISH

(DEPARTMENT OF ROMANCE LANGUAGES AND LITERATURES)

Office, University Hall, Room 35

Professor Bowen

1. **Elementary Spanish.** Grammar and Reader; modern stories and plays; composition and conversation. Four times a week. (First, Second and Third Terms. Offered as an alternative with French 1 and German 1 to those who enter with full or partial credit in Latin or without previous language training.)

SHOPWORK

(DEPARTMENT OF INDUSTRIAL ARTS)

Office, Hayes Hall, Room 2

Professor Sanborn, Assistant Professor Knight, Mr. Renck, Mr. Crowe

NOTE — For time requirements, credit given, and all similar information concerning shopwork courses, see table page 94.

3. **Foundry Work.** Exercises and practice in tempering sand and preparing moulds of machine parts in the sand, core-making, melting iron and brass and pouring castings.

4. **Chipping and Filing.** Exercises and practice in vise work, including chipping in cast and wrought iron, surface filing, squaring, fitting, finishing, and the scraping of surface plates.

7. **Carpentry and Pattern Making.** Exercises and practice in carpentry, wood-turning and pattern making, including sawing, planing, mortising, splicing, framing and other work involving the use of the ordinary carpenter tools; center and chuck turning; the making of finished patterns; and enough elementary molding to illustrate draft, parting, cores, etc.

8 **Carpentry: Cabinet Work.** Exercise and practice in cabinet making, including panelling, mitre and dovetail joints, etc.; use of power tools.

9. **Advanced Pattern Making.** Continuation of pattern work of Shopwork 7.

11. **Forging.** Exercises and practice in iron and steel forging, including such operations as drawing, bending, forming, upsetting, welding and the making and tempering of punches, drills, chisels, lathe tools, and springs.

12. **Advanced Forging.** Tool making, tempering of taps, dies, cutters, etc.; annealing; case hardening; ornamental iron work, etc.; visits to shops.*

13. **Machine Work.** Exercises and practice in hand-turning in iron and brass on speed lathes; in straight and taper burning, boring, fitting, chucking, and thread-cutting on engine lathes.

14. **Machine Work.** Exercises and practice on the lathe, planer, shaper, drill press and milling machine, with use of small tools as drills, taps, dies, reamers, counterborers, etc.; construction of parts of actual machines.

15. **Advanced Machine Work.** Exercises and practice on turret lathe, universal, surface and tool grinding machines, gear cutting, etc.

16. **Advanced Machine Work.** The construction and use of jigs and templates; the accurate laying out of work; the duplication of parts, the production of work rapidly and economically, etc.

17. **Advanced Machine Work.** The making and use of special tools and fixtures, standard plugs and collars, standard caliper and limit guages; error limits in modern machine construction; methods of testing the accuracy of machine tools, etc.

Shopwork Required.

NOTE — The present time requirements in shopwork are given in the following table, but a revision of this schedule is likely to soon be made necessary by the introduction of a summer course of four weeks.

Number	Credit	Year	Term	Courses in
3	2	2	1	M. E.: I. A. (short).
	3	2	1	I. A.: Man. Tr.
4	2	2	1	E. E.
	3	3	1	I. A.: Man. Tr.
	3	2	1	I. A. (short).
	3	2	2	M. E.
	2	1	3	Clay-w'k (short).
	3	4	1	Cer.
7	3	1	1	I. A. (short).
	3	2	1	Chem.: I. A.: Man. Tr.
	2	2	1	E. M.
	4	1	3	E. E.: M. E.
8	3	2	3	I. A.: Man. Tr.
9	3	2	2	I. A.: Man. Tr.
	3	1	2	I. A. (short).
11	2	2	1	E. E.
	3	2	1	M. E.
11	2	2	2	E. M.
	3	2	2	Chem.: I. A.: Man. Tr.
	3	1	3	Clay-w'k (short): I. A. (short).
	3	2	3	Mining (short).
	3	3	3	Cer.
12	3	2	3	I. A.: Man. Tr.
13	3	2	2	E. E.
	3	3	2	I. A.: Man. Tr.
	5	2	2	I. A. (short).
	3	2	3	M. E.
14	3	3	1	M. E.: E. E.
	3	3	3	I. A.: Man. Tr.
15	3	4	1	I. A.: Man. Tr.
	4	3	2	M. E.
	5	2	3	I. A. (short).
16	3	4	2	I. A.: Man. Tr.
17	3	4	3	I. A.

INDUSTRIAL DEPARTMENT - FORGEROOM

INDUSTRIAL DEPARTMENT — FOUNDRY

THE UNIVERSITY POWER PLANT

The buildings of the power plant were completed in 1896, and, with their contents, form a model plant. The boiler room is 38 by 100 feet, and is equipped with five 150 H. P. boilers, with Babcock and Wilcox chain grates and Murphy automatic stoker. There are also coal and ash conveyors for the whole plant. At one end of the boiler room is the coal room, and at the other the pit for the hot well, from which runs the tunnel (about three–fourths mile in length) to the buildings of the University, carrying heat, gas and water–pipes and power, light and other wires.

Near the boiler house is the power house, 40 by 60 feet. The power generating plant consists of a 70 Horse Power McEwen compound engine, belted to a 60 kilowatt 2–phase Westinghouse Alternator, and a 200 Horse Power Watertown Compound, direct connected to a 125 kilowatt 2–phase generator. These occupy the main floor, together with a complete marble switchboard, with ammeters, voltmeters, wattmeters, static ground detectors, etc. A ten–ton traveling crane is available for handling the machinery in this room.

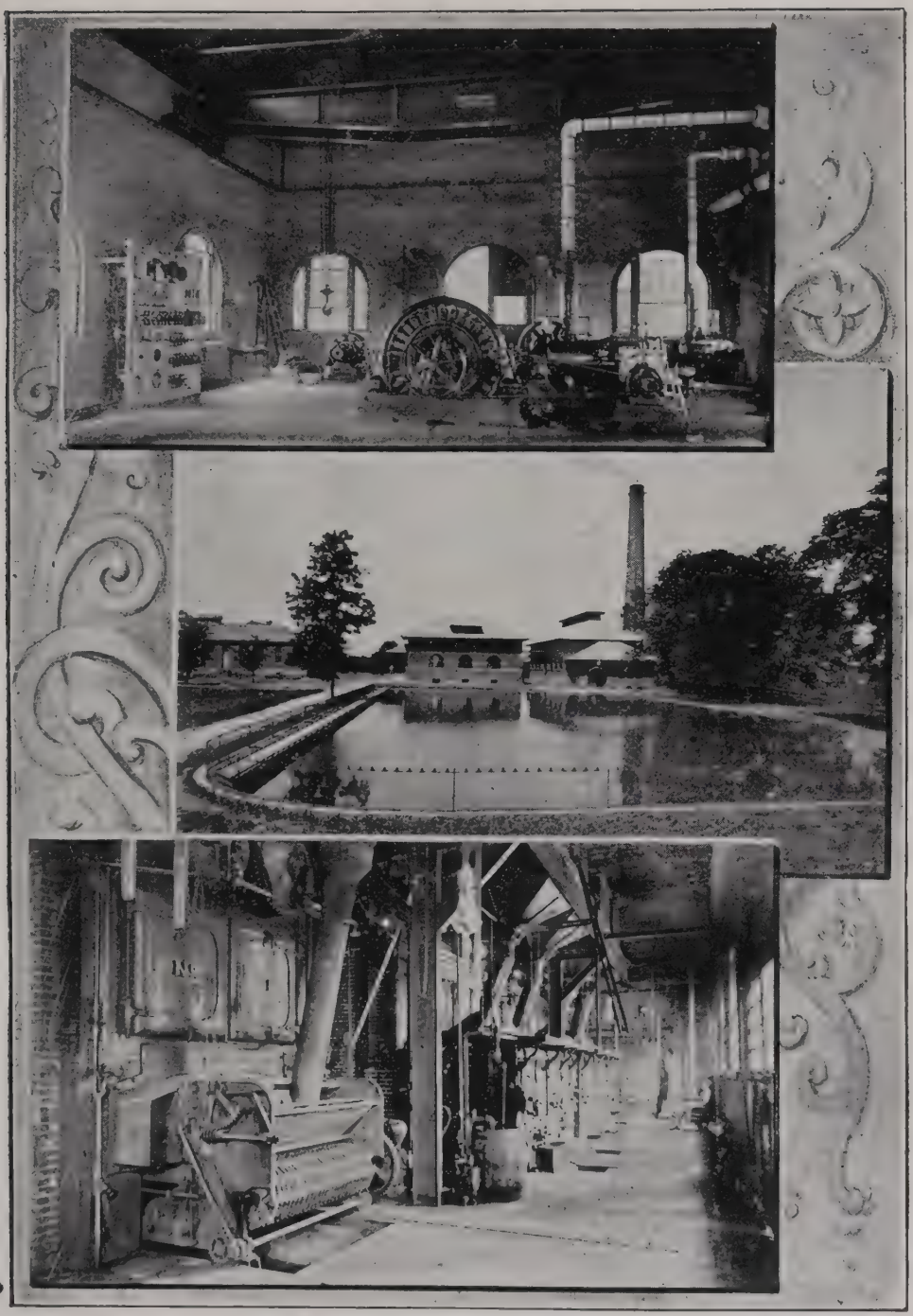
In the basement are condensers, which get their water from a large cooling reservoir at the side of the building. Here also are the transformers that convert the current to be used in the motors scattered over the campus, from 110 volts, at which it is generated, to 400 volts, at which it is transmitted.

There are installed on the campus over eighteen hundred incandescent lamps, twenty–four arc lamps and about 250 H. P. in motors. The electric plant is for the most part of the Westinghouse system. The buildings are of brick. Nearly all of the University buildings are heated by steam from this plant. The total cost of the plant for generation of power, light and heat, and for its transmission to the buildings, has been something over $100,000.

The views on the opposite page show the interiors of the engine house and boiler house above and below and in the center, a view of the whole plant, looking west across the reservoir.

During the year 1900 a very excellently equipped experimental steam boiler of 100 H. P. capacity was donated to the University by Dr. Stillman W. Robinson, Emeritus Professor of Mechanical Engineering. This boiler, one of the most complete things of the kind ever erected, has been located in the Boiler House, but belongs to the Experimental Engineering laboratory of the Department of Mechanical Engineering, and is under its supervision and control.

This gift, for the special prosecution of experimental research, adds greatly to the opportunities offered to students by the already extensive power and electric plants. A full description of it follows.



ENGINE ROOM

POWER PLANT — FROM EAST

BOILER ROOM

THE ROBINSON EXPERIMENT BOILER

In order to greatly facilitate experimental and research work in the direction of combustion of fuels under variable conditions as applied to steam generation, there was installed during the past year in the University boiler house, a most complete experiment boiler outfit. This equipment was furnished by Stillman W. Robinson, Emeritus Professor of Mechanical Engineering, who not only established the Department of Mechanical Engineering at Ohio State University and for many years was its head, but was the originator of the first Mechanical Engineering Department in this country connected with a state university, that at Champaign, Ill.

A Babcock & Wilcox boiler of 107 H. P., built for a working pressure of 200 lbs., with hand fired furnace of the oven fire-brick arch type, is the principle of the system. The products of combustion after passing the boiler can be conducted direct to the open air by the chimney or otherwise, or into a Green's fuel economizer where its 570 sq. ft. of heating surface transfers heat to the feed water on its way to the boiler. The heat of the escaping gases can still further be absorbed by an air heater having 1,330 sq. ft. of heating surface. The heat thus taken up is transmitted to the air employed in the fuel combustion.

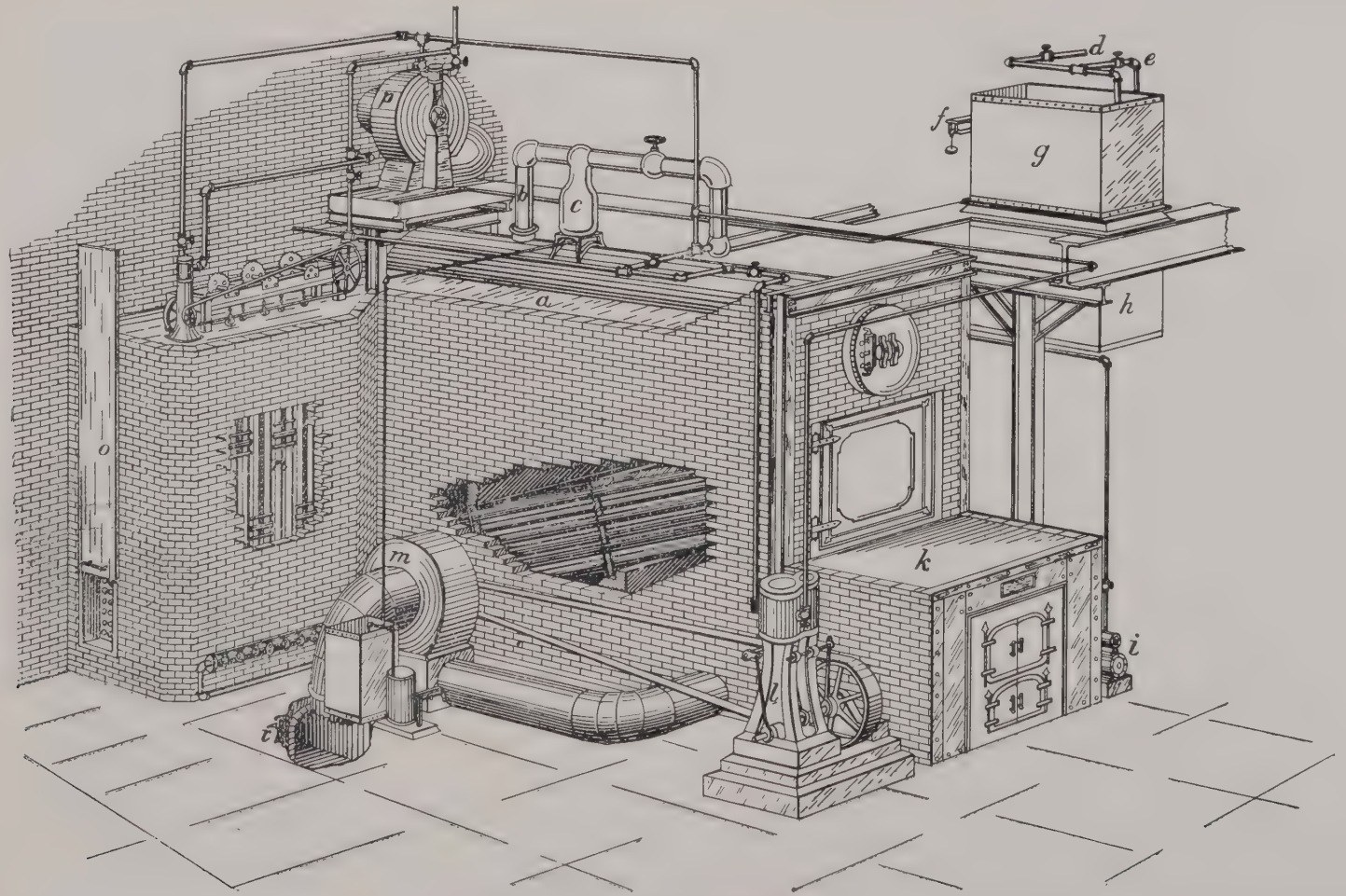
For promoting combustion, natural draft may be employed, or when greater intensity of draft is desired above that produced by the chimney, the latter can be cut out and a Sturtevant induced draft fan driven by a direct connected engine, brought into action. In combination with either mechanical induced or natural draft, forced draft produced by a belt driven Sturtevant fan, may be employed, and the air forced into the ash pit may be taken from the boiler room direct, or by a system of underground flues be compelled to pass through the air heater on its way to the fan

Weighing and collection tanks in conjunction with a steam pump supply the boiler with known quantities of water which flows by the way of the economizer or to the boiler direct. In this feed water system is a Hayden's feed water purifier with live steam heater, which may be used in conjunction with the economizer.

Draft intensity and temperatures are determined at many points throughout the system, a Le Chatelier pyrometer being used for high and mercurial pyrometers for low temperatures.

An Arndt's econometer indicates continuously the percentage of carbon dioxide in the escaping gases, while at the same time the Orsat's apparatus is used for giving absolute composition. The composition of the fuels employed and their calorific values are determined in the department of Metallurgy.

The plant as a whole admits of many combinations, thereby being able to meet almost every condition in practice.



THE ROBINSON EXPERIMENT BOILER

PHYSICAL EDUCATION

The Gymnasium is a large modern building, completed in 1898. The basement is used for lockers, dressing rooms and baths. The east end is used by the young women, the west end by the young men. Each end has separate shower and plunge baths.

The exercising floor, 80x150 feet, is thoroughly equipped with the best apparatus in duplicate. The running track is fourteen laps to the mile, with graded elevations at the curves to meet the requirements of the different rates of speed. The track is laid with felt an inch in thickness, three and a half feet wide and covered with rubber coated canvas.

The work is compulsory for the first and second year students. The course consists of theoretical and practical work in the gymnasium, and includes calisthenics, light and heavy gymnastics, physiology of exercise, physical examinations and measurements. It is intended to give the student such a training in the methods of Physical Education that he may have a comprehensive knowledge of the subject.

A thorough physical examination of each student is made in the fall, and the measurements are outlined on charts, so as to show the parts below the normal development, for which special exercises suited to the health and physical condition of each individual will be suggested. These charts are constructed from the accumulated data of several thousand measurements of college students. Experience demonstrates that the body, as well as the mind, is susceptible of right and wrong development. Every part of the body can be strengthened and increased and the relation of one part to another can also be changed so as to correct imperfections.

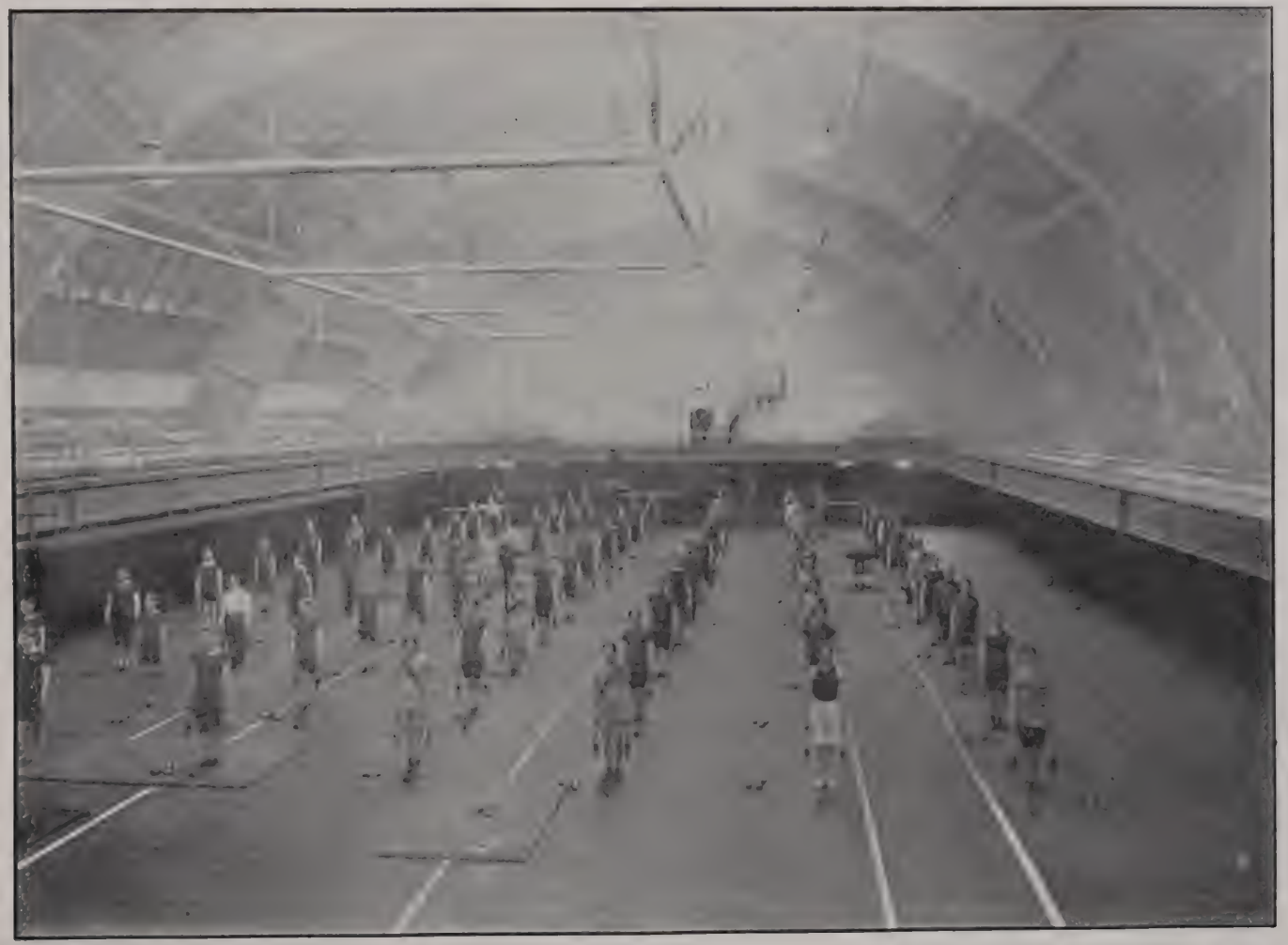
Class leaders who act as floor aids are selected from among those who show a proficiency in the work; these students are given a certificate of their appointment as Aids, and the letter A in scarlet which they are entitled to wear on their gymnasium suits.

It is the aim of the department to secure health, vigor and such harmonious development of the body as will fit it to resist disease, and prepare it for efficient service, both now and later in life.

Athletic Association

An important factor in the physical development of the students is the University Athletic Association, which is managed by a board made up of three members from the Faculty, three from the Alumni, and four from the student body. This board has complete charge of all intercollegiate events and does all in its power to promote base-ball, foot ball, tennis, basket ball, and track and other athletics.

The Association is in a most flourishing condition and the interest of the students generally in the matter is great and increasing. The Association has one of the finest athletic fields in this part of the country.



GYMNASIUM

MILITARY DRILL

The same building used as gymnasium is also employed as Armory and Drill Hall by the University Battalion. This is in charge of a Commandant from the United States Army, apart from whom it is officered entirely by the students. Since participation is required of all students during the first two years of their course, the size of the battalion is such as to make interesting manuevers possible. Besides its military importance as shown by the prominent place taken by former students among the Ohio troops sent to the late war, the great value of this work in the physical development of the students is thoroughly recognized by all educators.

The drill begins with four hours per week in the first term, which is outside, weather permitting. The fall work is largely devoted to squad drill in the setting up exercises, facings, marching, etc., and company drill according to progress of the squads. In December the drill is reduced to two hours per week during the months of December, January, February and March, with one hour additional for theoretical work. During these months drill is confined to work inside the Gymnasium, manual of arms, guard mounting and such ceremonies as can be performed within a limited space. From April 1st to the end of the term all work is outside, weather permitting, four days of each week as follows: Mondays, Company drill; Tuesdays, Battalion drill; Wednesdays, ceremonies other than guard mounting, and Thursdays, guard mounting and Company drill. During the entire year and on the same days as enumerated above, the O. S. U. Band either has its practice hour or takes part in ceremonies and drill. Similarly the Signal Corps belonging to the battalion exercises in the flag drill or at telegraph work. The battalion of cadets is modeled after a battalion of U. S. Infantry, and consists of four companies under command of a Cadet Major. Army regulations are followed strictly. The battalion for the year 1900–01 has averaged about four hundred and fifty men and officers under command of Cadet Major Kettler and Captains Morris, Scarlett, Hapgood and Neill.

CADET BATTALION ON DRESS-PARADE

STUDENT ORGANIZATIONS

Religious

One of the most commendable organizations in the University is a branch of the International Young Men's Christian Association, organized in 1883. It has a house and a large membership and steadily grows in influence. Services are held daily and weekly. New students are made cordially welcome, and young church members will here enjoy Christian influences and fellowship in college life.

Literary

There are five literary societies in the University, three of which are open to young men. These are the Alcyone Literary Society, founded in 1874, the Horton Literary Society, founded in 1875 and the Athenian Literary Society, founded in 1896. Each of these societies has commodious and well furnished apartments in University Hall. They meet weekly, and their work, offering to the student a very desirable training in composition, public speaking, and parliamentary order, is a very valuable adjunct to a collegiate education, *especially to students engaged in the technical courses*, whose prescribed work includes much less of this sort of training than is given to students in the academic lines.

Technical

The Engineering Society, Chemical Association, Ceramic Association and Tesla Club are organizations composed of instructors and students who meet to read and discuss questions of special interest. They aim to assist the students as early as possible in their course to begin the habit of accurate observation and description of engineering work wherever it may be met; also to develop the habit of constant study of periodical engineering literature and to stimulate among all classes of engineers an intelligent appreciation of the great works of engineering of every age and of every kind.

The effect of such societies is a most valuable supplement to the literary societies, as it gives practice in the art of presentation of technical subjects and in extemporaneous speaking and argument. It forms the most fitting training school for the technical societies with which engineers are likely to affiliate after graduation.

Miscellaneous

There are numerous other organizations, membership in nearly all of which is open to all students. Their various objects are sufficiently indicated by the following titles: the Biological Club, the Political Science Club, the Sketch Club, the English Club, the Dramatic Club, the Glee Club, the Mandolin and Guitar Club, the Banjo Club, the Orchestra and the Male Quartet.

Admission

The entrance examinations for 1901 will be held on Monday and Tuesday, September 22 and 23.

Applicants for admission to the College of Engineering must be at least 17 years of age. They must be provided with testimonials of good moral character from their last instructor. If they have previously attended any other college or university, they must present a letter of honorable dismissal therefrom. They must also give evidence of proficiency in the studies required for admission, either by *certificate* or *examination.*

CERTIFICATES

Certificates will be accepted in place of examination for those studies covered by them, when presented by graduates of such High Schools, Academies and Normal Schools in Ohio as have had their courses of study duly approved by the University.

In cases where the University faculty has specially designated any High School, on account of the high character of its work, as entitled to the privilege, students who have attended the school for at least two full years may present certificates for such entrance subjects as their work has covered, and will receive credit for the same.

Certificates, to be considered, must contain a detailed statement of the studies pursued, the text book used, and the amount of work done in each study, the amount of time devoted to it and the applicant's rank or standing. Blank forms for such certificates will be furnished on application.

All certificates will be passed upon by officers of the College of Engineering, and where certificates are received prior to September 1, applicants will be notified by mail, of the subjects, if any, upon which their certificates will be accepted in lieu of examination. In those subjects in which credit is not allowed, the regular entrance examination must be passed. Certificates sent in later than September 1 will be given the same consideration as those received earlier, but the College will not undertake to reply by mail and delay in matriculation may result.

EXAMINATIONS

Applicants presenting no certificates, together with those whose certificates are not accepted in full satisfaction of the entrance requirements, must pass examination on the subjects set forth below, or in such part of the same as has been found unsatisfactory in their certificate.

Entrance examinations will be held on Monday and Tuesday immediately preceding Commencement day and on Monday and Tuesday immediately preceding the opening of the first term of each year. Examinations not taken in this period may be taken thereafter subject to the convenience of the Professor in charge.

REQUIREMENTS FOR ADMISSION TO THE FOUR-YEAR COURSES

Applicants to be admitted to full university standing must obtain credit for all the subjects given below before entrance. Applicants who are slightly in arrears in these requirements, may be admitted to Freshman work, subject to certain entrance conditions as set forth in page 108. For the information of such applicants, a weighting or value is attached to those subjects in the following list upon which entrance conditions are permitted. From these they may determine their claims to admission and upon what subjects it will be necessary to strengthen themselves before coming to the University.

1. Mathematics

In addition to a thorough knowledge of arithmetic, the mathematics required comprise:

Algebra. Taylor's Academic is preferred, but Wentworth's, White's or Wells' Elements are accepted.

Geometry, Plane and Solid. Venable's, Wentworth's, White's or Wells'.

No deficiencies are permitted in Mathematics.

2. English

In addition to a good knowledge of Grammar, there is required:

English Composition and English Classics. — Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, *or equivalents*: Shakespeare's *Merchant of Venice, Julius Caesar,* and *Macbeth;* Milton's *Lycidas, Comus, L'Allegro, and Il Penseroso;* Burke's *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison;* The Sir Roger de Coverly Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

Scott and Denney's Composition and Rhetoric is recommended as a guide for the written work.

A weighting of one unit on each subject, or two units on both, is placed on this work.

3. Language

A knowledge of one language other than English is required for admission. French or German is preferred, but Latin will be accepted. Students preparing for an Engineering course are advised to take as early an opportunity as possible to begin the study of a modern language.

Those entering with French or German will be required to pursue the same language. The following are the requirements for each language:

Latin — Pronunciation (the Roman method); Grammar (an exact knowledge of the inflections is essential); Cæsar, the first four books of the De Bello Gallico.

French — The whole subject of French Grammar. Applicants will be expected to read at sight easy French and to translate correctly into French, simple English sentences.

German — Joynes–Messner's German Grammar, complete; Joyne's German Reader, complete; Hauff's Liechtenstein, Lessing's Minna von Barnhelm, Huss's Sessenheim and Buchheim, Goethe's Dichtung und Wahrheit.

A weighting of three units is placed on either of the three languages.

4. History

United States History. McLaughlin's History of the American Nation preferred. *A weighting of one unit is placed on this subject.*

General History. Myer's General History preferred. *A weighting of one unit is placed on this subject.*

Civil Government. Fiske or Thorpe preferred. *A weighting of one unit is placed on this subject.*

5. Science

Physics. Carhart and Chute, Gage, Avery or an equivalent. *A weighting of two units is placed on this subject.*

Physical Geography. Geike's Elementary Lessons or its equivalent. *A weighting of one unit is placed on this subject.*

ENTRANCE CONDITIONS

1901 — 1902

For the year 1901–1902, no student will be admitted to the College of Engineering who is in arrears more than *two units other than language,* and of this amount, none may be in Mathematics. In the case of students who cannot meet these language requirements, the following arrangements will be made:—

1. Those entering with less than the required amount of Latin will be permitted to make good their deficiency by an equivalent amount of work in French, German or Spanish. For this work they will receive no college credit.

2. Those entering with no training in language will be permitted to make good their deficiency by beginning either French, German or Spanish in the college. For this work they will receive no college credits.

1902 — 1903

Beginning with 1902–1903, no student will be admitted to the College of Engineering who is in arrears more than *two units,* none of which may be in mathematics, unless he is over 21 years of age. In that case, his deficiencies may include entrance language in addition to the above amount.

Removal of Conditions

All entrance conditions must be removed by the end of the second year, and by examination by the University officers. Certificates will not be received for entrance conditions after matriculation.

REQUIREMENTS FOR ADMISSION TO THE SHORT COURSES

Applicants must not be less than seventeen years of age, and unless they are over twenty–one years of age must pass an examination in Arithmetic, Geography, Grammar and Orthography, or bring High School or other certificates for these branches.

Applicants who are over twenty–one years of age are admitted without examination.

ADMISSION AS SPECIAL STUDENTS

Students who desire to pursue special lines of work in the University, and do not desire to become candidates for degrees, will be admitted on the following conditions:

1. The regular entrance requirements must be satisfied.

But applicants who are not less than eighteen years of age, after obtaining credit for elementary or "grade" work, and for such other subjects as may be necessary to qualify them for the classes that they wish to enter, may, on the presentation of satisfactory reasons, be admitted by the Faculty to any class in the College; provided, that if any student who has been admitted on these conditions afterwards becomes a candidate for a degree, he shall take the omitted entrance examinations at least twelve months before the degree is conferred.

2. On entering the College, students desiring to pursue special work are required to lay before the Faculty, for approval or modification, a written statement of the end they have in view, the studies proposed for the attainment of that end, and the probable period of attendance. Such students will be held as strictly to their accepted schemes of work as are the regular undergraduates to their courses of study.

3. *Permission to enter as special undergraduates will be refused to all who fail to give satisfactory evidence of definiteness of purpose and will be withdrawn whenever the conditions on which it was granted cease to exist.*

ADMISSION TO ADVANCED STANDING

1. Applicants who do not come from some other University or College must first obtain admission in the manner already described. They will then be examined on the undergraduate studies for which they ask credits.

2. Applicants who come from the collegiate department of an approved College, and who bring explicit and official certificates describing their course of study and scholarship, and also certificates of honorable dismission, will be admitted without examination, except such as may be necessary to determine what credit they are to receive here for work done in the College from which they come.

Attendance

Registration

All students are required to register and pay their term fees on or before the first day of each term, between the hours of 8:00 a. m. and 12 m., or between 1:00 and 4:00 p. m., central standard time.

Former students who fail to register as above will be charged one dollar in addition to the usual incidental fee, for the first day of delinquency, and fifty cents additional for each subsequent day.

No candidate for graduation will be permitted to register for the second term of his graduating year, except upon presentation to the Bursar of the President's certificate that his thesis subject has been announced and approved.

Amount of Work

No student is permitted to take less than fifteen credit hours a week of any sort of work, except by special permission, and no student will be permitted to take more than the regular work of the class to which he belongs, who has not passed all his work for the preceding term. A credit hour means one hour class room work in lecture, recitation or quiz, or two hours of laboratory work, once a week for one term.

Elective Studies

All elections of work in continuous studies, when once made, are understood to be made for the entire collegiate year.

The right is reserved to each professor to withdraw the offer of any elective study when it is not chosen by at least four persons.

Consultation

For consultation or information regarding work in any class or department, students will apply to the professor or instructor in charge.

For consultation or information in regard to their status as members of the College of Engineering, or for the filing of petitions, changes of course, changes of class cards, adjustment of schedules and similar needs, students will apply to the Secretary, who can be found every school day at his desk in the faculty room, University Hall, from 9 to 10 a. m.

On matters affecting their connection with the University, or in any way connected with the discipline of the institution, students will apply to the President of the University.

Examination and Standings

At the close of any term a student failing to pass in two-thirds of his work will be considered on probation; and a second similar failure incurred within the following ten academic months will forfeit his connection with the University.

The Convocation

At the opening of the year in September, 1900, the daily chapel exercises were abandoned. As a substitute for the short daily exercise, an entire hour is now devoted to a convocation at which the president presides. In addition to devotional exercises, an address is delivered upon some suitable topic. During this hour the libraries and laboratories are closed and no other University exercises occur. It is expected that the Faculty and students will attend. The hour is definitely fixed at ten o'clock on Wednesday of each week. The public is always welcome at the Convocation.

Graduation

Thesis

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of this study must lie within the field of the degree sought. The subject must be announced to the President of the University (dependent upon the approval of the head of the Department), not later than the beginning of the second term of the fourth year; and the completed thesis must be presented on standard paper of certain size and quality, type-written, bound, and titled, not later than the second Saturday before Commencement Day.

Degrees

The degree of Civil Engineer in Architecture is conferred on those who have completed the course in Architecture; that of Engineer of Mines in Ceramics to those who have completed the Course in Ceramics; that of Bachelor of Science in Chemistry on those who have completed the Course in Chemistry; that of Civil Engineer on those who have completed the Course in Civil Engineering; that of Mechanical Engineer in Electrical Engineering on those who have completed the course in Electrical Engineering; that of Bachelor of Science in Industrial Arts on those who have completed the Course in Industrial Arts; that of Bachelor of Science in Manual Training on those who have completed the Course in Manual Training; that of Mechanical Engineer on those who have completed the Course in Mechanical Engineering; that of Engineer of Mines on those who have completed the Course in Mining Engineering.

Except by unanimous consent of the Faculty, no candidate for graduation will be recommended for a degree whose record is not in all respects complete by the Friday evening previous to the Commencement Day on which he seeks the degree.

Expenses

Fees

Each student is required to pay an incidental fee of eighteen dollars a year, and the usual fees for the expense of laboratory work. Tuition is free.

Laboratory Fees.—Students in the laboratories and shops are required to pay fees to cover, in part, the cost of the material consumed, and the deterioration of the expensive instruments used by them. The fees charged per term in the laboratories mentioned below are as follows:

Ceramics, 4, 5, 6, 9, 10, 11, 12	$5 00
Drawing, 7	2 00
Electrical Engineering, 4 and 5 (4 or 5 hrs.), $7; (3 hrs. or less)	5 00
Gymnasium	1 00
Shop Work, 4 hrs or less	5 00
Shop Work, 5 hrs. or more	7 00
Mechanical Engineering, 12, 14, 15, 17, 24, 25, 27, 28, 29 and 30	5 00
Physics, 5, 6, 7, 9 (3 hrs.), $5; (over 3 hrs.)	7 00

In the laboratories of the Department of Chemistry, Ceramics and Metallurgy, each student is required at the beginning of each term to pay a fixed charge of one dollar and fifty cents for gas and water. He is also required to buy his own supplies, which may be obtained at the store-room in Chemical Hall. With reasonable care, this expense need not exceed $5.00 per term.

All term dues must be paid at the opening of each term as a condition of admission to classes.

A fee of five dollars to cover expense of graduation, diplomas, etc., is required of each person receiving one of the ordinary degrees from the University, and this fee must be paid before the degree is conferred.

Other Expenses

There are two dormitories on the University grounds for the use of students. Each occupant is charged by the University a rent of one dollar and fifty cents a term.

The South Dormitory affords unfurnished rooms to such students as desire to board themselves, and thus to reduce their expenses to a minimum. The expense of living in this way falls below two dollars per week. Applications for room should be made to the President of the University.

The North Dormitory will accommodate more than sixty students. Board, furnished rooms, fuel, light and washing are, at present prices, supplied for about three dollars and twenty-five cents a week. Students

will be admitted on special recommendation to the President of the University.

Boarding clubs are also formed in the neighborhood of the University. Furnished rooms are rented at seventy-five cents to one dollar a week for each student, and the cost of board is two dollars to three dollars a week.

Board, with furnished rooms, can be obtained in private families, within convenient distances of the University, at rates varying from four dollars to five dollars a week. The ruling rate may be taken as four dollars.

The uniform with which the members of the battalion are required to provide themselves costs about fourteen dollars. It is quiet in pattern, and is designed to be worn daily in place of civilian dress.

The expenses of a student in this College for a year may be estimated as follows, excluding clothing (except uniform) and traveling expenses:

	Low.	Average	High.
Incidental fees	$18 00	$18 00	$18 00
Laboratory fees	15 00	15 00	54 00
Books and stationery	15 00	25 00	40 00
Room	4 50	37 00	75 00
Furniture	10 00	.....	.....
Board	70 00	110 00	150 00
Uniform	14 00	14 00	14 00
	$146 50	$219 00	$351 00

The second and third estimates for room include light, fuel and care. The third estimate is for a room occupied by a single student. The requirements for laboratory fees and books depend upon the course of study pursued.

Self-Support

There is a large amount of work upon the University farm and in the shops and laboratories assigned to students, preference being given to those who are studying Agriculture or one of the Engineering Courses. But the University cannot promise work to all applicants. Many students find work in private families, in offices, and in various occupations, by means of which they defray at least a portion of their expenses. A person of ability and energy, who is master of a trade, or who can do good work of any kind, can generally find remunerative employment. It has seldom been known that any student of ordinary energy and industry was obliged to leave the University because of a lack of money for necessary expenses, after having been sixty days on the ground — or long enough to inform himself as to the opportunities for securing employment. An employment bureau is maintained at the University, where the names of those seeking work and of those desiring workers are recorded.

Enrollment

APRIL 1st, 1901

Students in Four Year Courses Leading to Degrees	453
Students in Short Courses, not Leading to Degrees	31
Special Students	21
Total	505

CLASSIFICATION BY COURSES

Name of Course Pursued	4th Year	3rd Year	2nd Year	1st Year	2nd Year, Short	1st Year, Short	Special	Total
Architecture	....	3	2	9	....	....	....	14
Ceramics	....	2	5	9	5	6	1	28
Chemistry	8	4	8	10	....	....	5	35
Civil Engineering	11	27	29	53	....	....	2	122
Electrical Engineering	6	11	25	69	....	....	1	112
Industrial Arts	....	....	1	2	4	9	1	17
Mechanical Engineering	7	22	35	51	....	....	1	116
Mining Engineering	2	10	10	21	2	6	2	53
Special, Unclassified	....	....	.....	.....	....	....	8	8
Total	34	80	115	224	10	21	21	505

Note: — For list of names, consult the General Catalogue of the University, which will be sent on application.

Graduates.

Civil Engineers (C. E.)	84
Mechanical Engineers (M. E.)	56
Mining Engineers (E. M.)	50
Electrical Engineers (M. E. in E. E.)	97
Chemistry (B. Sc. in Chemistry)	2
Industrial Arts (B. Sc. in Ind. Arts)	2
Ceramics (E. M. in Ceramics)	1
Master of Science, Conferred by College of Engineering	2
Total Degrees Conferred	294
Names Counted Twice	5
Total Number of Graduates	289

DIRECTORY OF GRADUATES.

The faculty of the College of Engineering are anxious to place a copy of each annual catalogue in the hands of their graduates. They will esteem it a favor if any alumnus who changes his residence will notify the secretary of the College of his new address and occupation. They will also be grateful for any information from any source, that may assist in making or keeping the Directory of the Alumni complete and correct.

A

ACKERMAN, ELI OSBORN, 1884, C. E. Station "B," Columbus, Ohio.	Engineer Maintenance of Way, Columbus Railway Company.
ACKERMAN, FREMONT, 1883, C. E.. Los Angeles, California.	Civil Engineer.
ALDRICH, EDGAR S., 1897, E. E..... Livingston, Mont.	Manager Livingston Water Power & Electric Light Co.
ALEXANDER, CHARLES P., 1896, E. E. Canton, Ohio.	District Manager, Northwestern Mutual Life Insurance Company.
ALEXANDER, ST. CLAIR, 1893, E. E..	
ALSDORF, FREDERICK C., 1892, E. M. Central City, Colorado.	Superintendent, Mt. Wilson Gold & Silver Mining Company.
ALSDORF, PERCY REED, 1896, E. M.. Central City, Colorado.	Standard Assay Office.
ARNOLD, EDWIN EBERT, 1898, M. E.	
ATKINSON, WARREN, 1899, M. E... Brooklyn, New York.	Maintenance Dept. New York Telephone Co.
AULD, JAMES A., 1897, E. E..... Columbus, Ohio.	With D. S. Auld.

B

BARCUS, MINER, 1897, E. E..... Schnectady, N. Y.	Draftsman with General Electric Company.
BARNABY, CHARLES L., 1898, C. E.. Cincinnati, Ohio.	Assistant on Engineer Corps, Cincinnati Division, P., C., C. & St. L. Ry.

Barrows, Harry H., 1898, C. E... Lexington, Ky.	Resident Engineer Cinti. Southwestern Railway.
*Bartholomew, Clyde S., 1896, C. E.	Died June 23, 1900.
Beach, David Price, 1895, C. E..... Wellsville, Ohio.	Assistant, Engineer Corps, Pennsylvania R. R. Company.
Beck, Arthur Andrew, 1893, C. E. Columbus, Ohio.	Deputy County Surveyor.
Belden, Sanford Bonner, 1895, E.M. Pittsburgh, Pa.	Manager Pittsburg Office Jeffrey Manufacturing Company.
Biebel, Herman M., 1896, E. E... Chicago, Illinois.	Engineering Department, Western Electric Company.
Bischoff, John Wallace, 1899, E.M. Robertsdale, Pa.	Engineer Rockhill Iron and Coal Co.
Bissing, William, 1893, E. E..... Washington, D. C.	Examiner, U. S. Patent Office.
Blackburn, Frank H., 1896, E. E. Fostoria, Ohio.	Electric Engineer, Fostoria Incandescent Lamp Company.
Bloom, J. George, 1889, C. E..... Chillicothe, Ohio.	Division Engineer, Ohio Division B. & O. R. R.
Bowden, Harry William, 1900, C. E. 579 E. Division St., Chicago, Ill.	With Structural Dept. Illinois Steel Co.
Bower, Jerome G., 1897, M. E..... Columbus, Ohio	Motive Power Dept. P., C., C. & St. L. R. R.
Bradford, Joseph Nelson, 1883, M.E. Columbus, Ohio.	Professor, Drawing, Ohio State University.
Brophy, James Francis, 1899, E. M. Coopers, W. Va.	Engineer for Cooper Interests in Mercer and McDowell Counties.
Brown, Frederick W., 1888, E. M. Portland, Colorado.	Chemist for Colorado Portland Cement Co.

* Dead.

Brown, Newton H., 1893, E. E... Newark, Delaware.	Professor Electrical Engineering, Delaware College.
Brumley, Daniel Joseph, 1895, C. E. Louisville, Kentucky.	Assistant Engineer, Louisville & Nashville R. R.
Bruning, Henry D., 1896, C. E... Logansport, Ind.	Assistant Engineer, P., C., C. & St. L. R. R.
Buchenberg, Alvin E., 1900, E. E.. Schenectady, N. Y.	
Buckman, Arthur L., 1897, E. E. Toledo, Ohio.	Wire Chief, Central Union Telephone Company.
Burns, James Furgeson, 1891, C.E. Hopkinsville, Kentucky.	Assistant Engineer, Louisville & Nashville R. R.
Bygate, Harry G., 1899, M. E..... Munhall, Pennsylvania.	Draftsman, Homestead Steel Wks.

C

Calkins, George Herbert, 1895, E. E. Schenectady, N. Y.	Production Clerk, General Electric Company.
Capron, Marshall F., 1888, M. E..	
Carr, Hugh Stanley, 1896, E. E.. Lawrence, Kansas.	Assistant Professor Electrical Engineering, University of Kansas.
Carroll, Patrick Henry, 1894, E. M. Herrin, Illinois.	Superintendent, Big Muddy Coal & Iron Company.
Carson, Samuel King, 1895, E. E. Manila, P. I.	Acting Assistant Surgeon, U. S. A.
Catlin, Homer Clark, 1896, C. E. Allegheny, Pa.	Bridge Draftsman, McClintic-Marshall Construction Co.
Cavanaugh, Andrew F., 1900, M.E. Lockport, N. Y.	Draughtsman Holly Mfg. Co.
Cellarius, Frederick J., 1888, C. E. Dayton, Ohio.	Assistant City Engineer.

Chappell, Walter Evans, 1898, E.E. U. S. F. S. "Chicago," South Atlantic Station, S. A.	First Class Electrician U. S. S. "Chicago."
Cilley, Raymond, 1896, M. E..... Brooklyn, N. Y.	Asst. to Gen. Supt., D. E. Dion–Bouton Motorette Co.
Clarke, C. J., 1899, C. E..... Chillicothe, Ohio.	Draftsman County Engineer's Office.
Coddington, Edwin F., 1896, C. E., M. Sc., 1897. Berlin, Germany.	Post–graduate student.
Cole, George Nathan, 1891, E. E.. 265 Broadway, New York, N. Y.	Contractor Railroad Supplies.
Collins, Curtis, 1895, E. E..... San Juan, Puerto Rico.	Electrical Engineer for S. A. Luz Electrica and Rio Plata Electric Co.
Connell, William A., 1886, E. M. Kansas City, Missouri.	Secretary, Virginia Manganese Iron & Coal Company.
Conway, Hugh L., 1896, C. E..... Cincinnati, Ohio.	Levelman, New Water Works.
Cope, Albert N., 1897, E. E..... Columbus, Ohio.	
Covell, Vernon Royce, 1895, C. E. Pittsburgh, Pennsylvania.	County Engineer's Assistant.
Cunningham, E. W., 1894, C. E.. Pittsburgh, Pennsylvania.	Pittsburgh Bridge Works.
Curtis, Leigh Goodrich, 1899, C. E. Zanesville, Ohio.	Department M. of W., B. & O. R. R.

D

Damron, Carson W., 1897, M. E.. Fairmont, W. Va.	Chief Draftsman, Wagner–Palmros Mfg. Co.
Davis, Charles William, 1894, E.M. Colorado Springs, Col., care J. McK. Ferriday & Co.	General Mining Business.

Davis, Oscar Allen, 1897, E. E... Alliance, Ohio.	Draftsman, Morgan Engineering Company.
Deahl, Walter Smith, 1896, C. E. Pittsburgh, Pennsylvania.	Pittsburgh Bridge Company.
DeLoffre, Andre, 1896, E. E..... Silverton, Colorado.	Electrical Engineer, Silver Lake Mines.
Diemer, Hugo, 1896, E. E..... Agricultural College, Mich.	Assistant Professor Mechanical Engineering, Agricultural College.
Donham, Maurice D., 1896, M. E. Warren, Pennsylvania.	Chief Draughtsman, Jacobson Machine Mfg. Co.
Drummond, William G., 1900, M.E. Cleveland, Ohio.	Draftsman, The Brown Hoisting Machinery Co.
Dun, John J., 1883, E. M..... Columbus, Ohio.	Consulting Engineer.
Dunlap, Thaddeus Cox, 1895, E. E. Columbus, Ohio.	Manager Columbus Pneumatic Tool Co.
Dunlop, Robert Rowe, 1900, E. E. Schenectady, N. Y.	Testing Department General Electric Co.
Dunnick, Edward, 1897, C. E.... Mt. Vernon, Ohio.	Draftsman, Mt. Vernon Bridge Co.

E

Erskine, James H., 1886, E. M... Albany, Oregon.	Physician and Surgeon.
Estep, Frank Leslie, 1898, E. E... Bridgeport, Conn.	Foreman Copper Rolling Mill, Bridgeport Brass Co.
Evans, Peter Platter, 1892, C. E. Cleveland, Ohio.	Engineer of Erection, King Bridge Company.
Eysenbach, Ernest E., 1896, E. M. Columbus, Ohio.	Superintendent, Columbus Gas Company.

F

Feicht, Russell S., 1890, E. E.... Pittsburgh, Pennsylvania.	Engineering Department, Westinghouse Electric & Manufacturing Company.
Fergus, Guy Carlton, 1898, E. E.. Zanesville, Ohio.	Partner, Zanesville Electric Co.
Fickes, Walter Morgan, 1900, E.M. (Ceramics). Carnegie, Pa.	Manager of the Rosslyn Brick Co.
Fish, Fred Alan, 1898, E. E..... Madison, Wis.	Honorary Fellow in Electrical Engineering at University of Wisconsin.
Floto, Julius, 1889, E. M..... Anaconda, Montana.	With Anaconda Copper Mining Co.
Flynn, Benjamin H., 1898, C. E.. Columbus, Ohio.	Engineer to the Ohio State Board of Health.
Flynn, Harry Franklin, 1892, C.E. Washington, D. C.	Assistant on U. S. Coast and Geodetic Survey.
Foster, Frank M., 1894, E. E.... Cincinnati, Ohio.	With John N. Poage, Water Columns and Valves.
Fowler, Harry R., 1894, E. E.... Toledo, Ohio.	Electrical Engineering and Contracting.
Fox, John Herbert, 1897, M. E.... Cleveland, Ohio.	Mechanical Engineer in Charge of Engine Dept., The Brown Hoisting Machinery Company.
Frankenburg, John T., 1899, E. E. Columbus, Ohio.	With Central Union Telephone Co.
Fravel, George B., 1888, M. E.... Columbus, Ohio.	Mechanical Engineer, Pennsylvania Lines.
Frayer, Lee Ambrose, 1896, M. E. Columbus, Ohio.	Frayer & Miller, Motor Cycles.
Freeman, Stanton S., 1898, E. M. Parryville, Pennsylvania.	Superintendent, Carbon Iron & Steel Company.

FRENCH, THOMAS EWING, 1895, M.E. — Assistant Professor of Drawing, Ohio State University.
Columbus, Ohio.

FROST, GEORGE WINFIELD, 1900, M. E. — Fellow in Mechanical Engineering, Ohio State University.
Columbus, Ohio.

G

GALLEN, WILLIAM F., 1897, M. E.. — Jeffrey Manufacturing Company.
Columbus, Ohio.

GAMPER, HERMAN, 1899, M. E..... — Ingersoll–Sergeant Drill Co.
Easton, Pa.

GARBER, JOHN MURRAY, 1897, C. E. — Draftsman, Mt. Vernon Bridge Co.
Mt. Vernon, Ohio.

GEE, EUGENE C., 1897, E. E..... — Wire Chief, C., D. & P. Telephone Co.
Wheeling, West Virginia.

GEHRKENS, EDWARD F., 1894, E. E. — General Electric Company.
Schenectady, N. Y.

GIVEN, JAMES BYRON, 1896, E. E.. — Western Electric Company.
Chicago Illinois.

GODDARD, LORING HAPGOOD, 1892, C.E. — Farmer and Stockman.
Manara, Ohio.

GOODELL, RALPH SPENCER, 1892, C.E. — Principal Assistant Engineer, Mt. Vernon Bridge Works.
Mt. Vernon, Ohio.

GRAHAM, EMERY EUGENE, 1898, E.E.

GRATE, CHARLES ARTEMUS, 1898, M.E. — Struthers, Wells & Co.
Warren, Pennsylvania.

GREEN, JEROME JOSEPH, 1893, E. E.. — Professor of Physics and Electrical Engineering, University of Notre Dame.
Notre Dame, Indiana.

GREEN, JOSEPH FARIST, 1899, E. E.. — Electrical Engineer, M. E. Co.
Moline, Illinois.

GREGORY, HIRAM D., 1880, E. M.... — Attorney–at–law.
Covington, Ky.

Griffin, Mark H., 1897, E. E..... Toledo, Ohio.	
Groves, John Wesley, 1898, C. E. Athens, Ohio.	Engineer for Sunday Creek Coal Co.

H

Haas, F., 1895, C. E.; 1896, E. M. Catoctin Furnaces, Md.	Manager Blue Mountain Iron & Steel Co.
Hale, Frederick James, 1898, M.E.; 1900, M. Sc. Pittsburgh, Pa.	Westinghouse Machine Co., Gas Engine Dept.
Hall, Harry R., 1889, E. M..... Port Townsend, Wash.	Resident Engineer, Wellman-Seaver Engineering Co.
Harkins Robert Rusk, 1900, M. E. Columbus, Ohio.	With Crass Harkins.
Harrison, William H., 1885, C. E. Clifton, Arizona.	Civil and Mining Engineer.
Hartwell, Arthur, 1888, M. E.... Chicago, Illinois.	Manager, Chicago Office, Westinghouse Electric & Mfg. Co.
Hartwick, Louis M., 1897, M. E.. Pueblo, Colorado.	Colorado Fuel & Iron Co.
Hassler, Robert Hanich, 1892, E.E. Indianapolis, Indiana.	Electrical Engineer, American Bicycle Co., Waverly Factory.
Hayman, William C., 1900, E. E. Schenectady, N. Y.	Testing Dept. General Electric Co.
Hayward, George E., 1893, C. E... Mankato, Minn.	Roadmaster, C. & St. P., M. & O. Ry.
Hazlett, Robert Jr., 1887, C. E... Wheeling, West Virginia.	Consulting Civil Engineer, County Engineer and Chief Engineer N. O. U. Electric Ry.
Hebble, Charles Roy, 1896, E. E..	
Heller, Albert Henry, 1890, C. E. New York, N. Y.	Assistant to Vice-President, American Bridge Co.

Henderson, Adelbert A., 1898, C.E. Pittsburgh, Pennsylvania.	Transitman, County Engineer.
Henretta Charles M., 1896, E. M. Fernic, B. C.	Mining Engineer.
Hertner, John Henry, 1899, E. E. Cleveland, Ohio.	Foreman of Machine Shop, Lincoln Electric Co.
Hewitt, Strafford R., 1898, E. E.. Columbus, Ohio.	Engineer for Columbus Mine and Mill Supply Co.
Hine, Lucius A., 1888, E. M..... Chicago, Illinois.	President and Treasurer, Hine-Watt Manufacturing Company.
Hipple, John Merton, 1898, E. E. Wilkinsburg, Pennsylvania.	Inspector, Westinghouse Electric & Manufacturing Company.
Hirsch, Gustav, 1897, E. E..... Columbus, Ohio.	Engineer, Columbus Citizens' Telephone Company.
Homan, Frank, 1895, C. E..... Cannelton, West Virginia.	General Manager and Treasurer of the Raven Coal & Coke Company.
Howald, Ferdinand, 1878, B. Sc.; 1881, E. M. Rush Run, Fayette Co., W. Va.	Coal Operator.
Howells, E. S., 1884, E. M..... Massillon, Ohio.	Engineer, Howells Mining Company.
Howells, Thomas J., 1897, E. M.	
Hunt, William F., 1887, M. E.... St. Paul, Minn.	Attorney-at-law.
Hunter, Madone C., 1900, E. E... Chicago, Illinois.	With Western Electric Co., Dynamo Department.
Huntington, Arthur, 1899, M. E. Evanston, Illinois.	Chief Engineer, Evanston Electric Illuminating Co.
Hyle, Charles A., 1896, E. E..... Kansas City, Mo.	Observer U. S. Weather Bureau.

I

Ireland, Guy L., 1895, M. E.....	
Irvin, Chadwick H., 1897, M. E.. Sharon, Pa.	Draftsman, Sharon Steel Co.

J

Jenkins, William G., 1893, C. E.. Bellefontaine, Ohio.	Draftsman, The Bellefontaine Bridge & Iron Co.
Jenkins, Willis H., 1894, C. E... Carnegie, Pa.	Transitman, Pennsylvania Lines West of Pittsburg.
Jennings, Levi E., 1897, E. E.... Eaton, Ohio.	With County Surveyor at Dayton, Ohio.
Johnson, Charles W., 1896, E. E. Cincinnati.	Chief Draftsman, Bullock Electric Manufacturing Company.
Johnson, Earl Stinson, 1900, E. E. Chicago, Illinois.	With Western Electric Company.
Johnson, Herbert L., 1892, E. E..	
Johnston, George E., 1892, C. E... Louisville, Kentucky.	Civil Engineer, L. & N. R. R. Co.
*Jones, A. A., 1886, C. E.....	Died May, 1894.
Jones, Arthur James, 1898, E. E.. Wilkinsburg, Pennsylvania.	Draftsman, Westinghouse Electric & Manufacturing Company.
Jones, Alexander H., 1895, E. E.. St. Louis, Mo.	Consulting Electrical and Mechanical Engineer.
Jones, Pearl N., 1892, E. E..... Wilkinsburg, Pennsylvania.	Engineer and Salesman, Westinghouse Electric & Mfg. Co.
Jones, Smilie, 1894, E. M..... Prescott, A. T.	Superintendent, Empire Gold Mining & Milling Company.

* Dead.

JUDD H., 1897, M. E.; 1899, M. Sc. Brooklyn, N. Y.	Assistant in Technical Laboratory, Pratt Institute.

K

KANMACHER, SAMUEL H., 1900, E. E. Schenectady, N. Y.	Testing Department, General Electric Co.
KEFFER, FREDRICK, 1882, E. M..... Anaconda, British Columbia.	General Manager, The British Columbia Copper Co., Ltd.
KEMMLER, EDWARD A., 1888, C. E.. Columbus, Ohio.	Assistant City Engineer.
KERR, SAMUEL THOMPSON, 1894, E.E. Martins Ferry, Ohio.	Superintendent Municipal Electric Light Plant.
KESTER, FREDRICK EDWARD, 1895, E.E. Columbus, Ohio.	Instructor in Physics, Ohio State University.
KIESEWETTER, L. F., 1891, C. E.... Columbus, Ohio.	Cashier, The Ohio National Bank.
KLINE, CHARLES H., 1897, E. E.... Dayton, Ohio.	Civil Engineer and Deputy County Surveyor.
KNECHT, ARTHUR E., 1898, M. E... Cincinnati, Ohio.	Mechanical Engineer, Cincinnati Screw & Tap Co.
KNIGHT, WILLIAM ABNER, 1900, E.E. Columbus, Ohio.	Assistant Professor of Machine-Shop Practice, Ohio State University.
KNOX, FRANK S., JR., 1900, E. M.. Grays Flat, West Virginia.	Resident Engineer Federal Coal and Coke Co.
KRUMM, LOUIS RALPH, 1898, E. E.. Columbus, Ohio.	Engineer, Columbus Citizens' Telephone Company.
KUHN, VALLIE HOWARD, 1896, E. E. Etna, Ohio.	

L

LAMB, WHITNEY EARL, 1900, E. E. Schenectady, N. Y.	Testing Department, General Electric Company.

LAMME, BENJAMIN G., 1888, M. E. Pittsburg, Pennsylvania.	Engineer, Westinghouse Electrical & Manufacturing Company.
LAMME, BERTHA A., 1893, E. E.... Pittsburgh, Pennsylvania.	Westinghouse Electric & Manufacturing Company.
LARGE, JOSEPH H., 1890, C. E..... Massillon, Ohio.	Draftsman, Massillon Bridge Co.
LEE, CORLISS EDGAR, 1900, E. E.... Schenectady, N. Y.	With General Electric Company.
LEE, ROBERT M., 1897, M. E..... Schenectady, N. Y.	Draftsman, General Electric Co.
LEVERING, ORPHEUS D., 1893, M. E. Columbus, Ohio.	Foreman of Tool Room, Columbus Machine Company.
LINCOLN, PAUL M., 1892, E. E..... Niagara Falls, N. Y.	Resident Electrician, Niagara Falls Power Company.
*LINDO, WILLIAM C., 1896, C. E....	Died, 1900.
LINEBAUGH, JESSE JOSEPH, 1899, E. E. Schenectady, N. Y.	Electrical Engineer, Testing Department, General Electric Co.
LINVILLE, C. P., 1900, B. Sc. (Chem.). Columbus, Ohio.	Fellow in Chemistry, Ohio State University.
LOGAN, LAVALLETTE L., 1896, E. M.	
LOTT, CHARLES MILFORD, 1895, E. E. Hicksville, Ohio.	Proprietor and Superintendent of Hicksville Electric Light Plant.
LOVEJOY, ELLIS, 1885, E. M..... Union Furnace, Ohio.	Superintendent, Columbus Brick & Terra Cotta Company.
LYON, ARTHUR H., 1900, M. E..... Memphis, Tenn.	Brick Manufacturer.

* Dead.

M

MANLEY, RUSH EMMETT, 1894, E.E.
Mt. Vernon, Ohio.
Manager, Telephone Exchange, Central Union Telephone Co.

MARQUARD, FRANK F., 1896, C. E..
Sharon, Pennsylvania.
Chief Chemist, The Sharon Steel Company.

MARSHALL, WILLARD B., 1900, E. E.

MARTIN, GEORGE, 1897, E. E.....
Youngstown, Ohio.
Wire Chief, Central Union Telephone Company.

MARTIN, PERCY, 1892, E. E.....
Milan, Italy.
General Manager, Mediterranean Electrical Mfg. Company.

MARVIN, CHARLES F., 1883, M. E...
Washington, D. C.
Professor of Meteorology, in Charge Instrument Division, U. S. Weather Bureau.

MASTERS, GEORGE ALBERT, 1886, C.E.
4558 Oakenwald Avenue,
Chicago, Illinois.
Assistant Manager, Western Library Association.

MATSON, WILLIAM EDGAR, 1896, E.E.
Lynn, Massachusetts.
Production Department, General Electric Company.

MCALLEN, WILLIAM J., 1894, C. E..
Chicago, Illinois.
Civil Engineer, Structural Department, Illinois Steel Company.

MCCARTER, ROBERT D., JR., 1895, E.E.
110 Cannon St., London, E. C., England.
Electrical Engineer, General Electric Company of New York .

MCCORMICK, JOHN H., 1880, M. E..
Columbus, Ohio.
Mechanical Engineer.

MCCORMICK, WILLIAM F., 1896, M.E.

MCGREW, JOHN A., 1895, C. E.....
Logansport, Indiana.
Engineer, M. of W. Pennsylvania Company, Logansport Division.

MCGUFFEY, FRANCIS H., 1894, E. E.
Lima, Ohio,
Designer.

McIntire, Alfred Heber, 1898, E.E.; 1900, M. E. Schenectady, N. Y.	Testing Department, General Electric Company.
McNarry, George B., Jr., 1896, E.E. Toledo, Ohio.	Traveling Salesman, T. Bissell & Company.
Menough, Arthur G., 1894, E. M. Wellsville, Ohio.	Assayer and Chemist.
Mercer, Frank Emmett, 1896, E.E. Wauseon, Ohio.	Manufacturer.
Mershon, Ralph D., 1890, M. E.. New York City.	Consulting Engineer.
Miller, Frank Case, 1893, C. E... Dwight, Illinois.	Supervisor, Chicago & Alton R. R., Dwight to Springfield.
Miller, Harry F., 1889, M. E.....	
Morris, Clyde Tucker, 1898, C. E. Youngstown, Ohio.	Draftsman, Youngstown Bridge Company.
Morrison, Robert O., 1893, C. E.. New Castle, Pennsylvania.	Assistant on Engineer Corps, Erie & Ashtabula Division of Pennsylvania Lines West of Pittsburg.
Morton, George L., 1884, M. E.... Washington, D. C.	Principal Examiner, U. S. Patent Office.
Munn, Mortimer Adam, 1894, C.E. Cleveland, Ohio.	Civil Engineer, with E. P. Roberts Company.
Myers, Albert B., 1900, E. M..... Fairmont, W. Va.	Engineer for Wagner & Palmros Manufacturing Company.
Myers, Ord, 1895, E. E..... New York City.	Inspector, Metropolitan Street Railway Company.
Myers, Roy V., 1893, C. E..... Dayton, Tennessee.	Superintendent Mines, Dayton Coal & Iron Co., Ltd.
Myers, Uriah H., 1887, E. M..... Pittsburgh, Pennsylvania.	Printer and Stationer.

N

Nagel, William G., 1895, E. E.... Toledo, Ohio.	Manager, W. G. Nagel & Co., Electric Supplies.
Needham, Harry S., 1900, M. E.. Indianapolis, Indiana.	Special Apprentice, Pennsylvania R. R.
Newton, Samuel Donald, 1895, C.E.	
Nicholson, Charles M., 1900, E. E.	
Nold, John H., 1900, E. M..... Columbus, Ohio.	Mine Engineer, Assistant to F. A. Ray.
Nurian, Kerson, 1899, M. E..... Turtle Creek, Pennsylvania.	Westinghouse Electric & Manufacturing Company.

O

O'Brine, David, 1881, B. Sc., M. Sc., 1882, E. M., D. Sc., M. D. Urbana, Ohio.	Physician and Surgeon.
Orton, Edward, Jr., 1884, E. M . Columbus, Ohio.	Professor of Ceramics, Ohio State University, State Geologist of Ohio.

P

Pabodie, Robert Jewett, 1899, M.E. Watertown, N. Y.	Assistant General Foreman, Watertown Steam Engine Company.
Palmer, Walter K., 1893, M. E.. Lawrence, Kansas.	Associate Professor, Department Mechanical Engineering, University of Kansas.
Patch, Homer Austin, 1896, C. E. Minneapolis, Minn.	Draftsman, Gillette-Herzog Manufacturing Company.
Payne, Halbert Edward, 1887, M.E. New York City.	President American Typewriter Company.
Pearl, Allen Sexton, 1894, E. E.. Columbus, Ohio.	Ohio Representative of Central Electric Company, Chicago, Ill.

Pedlow, Edward B., 1893, C. E.... New Straitsville, Ohio.	General Superintendent, C. & H. C. & I. Co.
Pence, David Arrel, 1894, M. E. . Lowellville, Ohio.	Business.
Peppel, Samuel Vernon, 1899, B.Sc. (Chem.). Columbus, Ohio.	Assistant in Department of Clay-working and Ceramics, Ohio State University.
Peters, William L., 1885, M. E... Riverside, California.	Merchant and Horticulturist.
Peirce, John Mattison, 1895, E. E. South Charleston, Ohio.	
Pilcher, Hastings Moore, 1895, E.E. Cannelton, West Virginia.	Electrician and Engineer of C. C. Co.
Pleukharp, Rev. C. V., 1885, M. E. La Crescenta, California.	Fruit Grower.
Polk, Walter C., 1895, C. E..... Columbus, Ohio.	Superintendent of Construction, Central Union Telephone Co.
Postle, Herman R., 1894, C. E.... Columbus, Ohio.	Teacher in Columbus North High School.
Powell, Charles S., 1893, E. E... Cleveland, Onio.	Manager Cleveland Office, Westinghouse Electric & Mfg. Co.
Pratt, Fred Kellogg, 1900, C. E.. St. Clairsville, Ohio.	Topographer, Wheeling & Lake Erie R. R.

R

Rawson, Levi, 1899, C. E..... Sistersville, W. Va.	Engineer, Carter Oil Company.
Ray, Frank A., 1887, E. M..... 137 King Ave., Columbus, Ohio.	Professor of Mine Engineering, Ohio State University.
Ray, William M., 1893, C. E..... Cleveland, Ohio.	Assistant Engineer, C., L. & W. R. R. Co.
Raymond, Coles Abel, 1894, C. E. Toledo, Ohio.	Draftsman, Toledo Bridge Co.

Reed, Robert Browning, 1896, E. E. Zanesville, Ohio.	Partner, Zanesville Electric Co.
Reed, William Allen, 1897, E. M. Querida, Colorado.	Mining Engineer, Bassick Gold Mine Co.
Reeves, Archibald C., 1887, C. E.. Dayton, Ohio.	Assistant City Engineer.
Rice, Herbert A., 1897, C. E..... Jackson, Ohio.	Assistant Principal High School.
Riddle, Howard Sterling, 1897, E.E. Akron, Ohio.	Mechanical Engineer, The Diamond Rubber Co.
Roberts, Cyrus Swan, 1898, E. M.	Chemist and Assayer.
Robinson, Erdis Geroska, 1893, C.E. Guadalajara, Mexico.	Resident Engineer, Engineering Department, Mexican Central Ry.
Rogers, James Bertrand, 1896, E.M. Leetonia, Ohio.	Chemist, Salem Iron Company.
Root, Willis J., 1885, E. M..... Columbus, Ohio.	Chemist, National Steel Company, Columbus Works.
Rowlee, Henry A., 1897, M. E....	Inspector, Ordnance, U. S. Army.
Ruhlen, Carl Marble, 1898, M. E. Tacoma, Wash.	Assistant Quartermaster's Agent, U. S. Army.

S

Schaub, Edward L. T., 1885, M. E. Columbus, Ohio.	Assistant Superintendent, Associated Charities.
Schaup, Charles E., 1897, E. M.. Berrysburg, West Virginia.	Chief Engineer, Southern Coal & Transportation Company.
Scheibell, William O., 1888, E. M. Columbus, Ohio.	General Manager, The American Art Tile Company.

Schreiber, George Ernst, 1900, E.E. St. Louis, Mo.	Electrical Engineer, with H. H. Humphrey.
Schreiber, John Martin, 1899, E.E. Cleveland, Ohio.	Engineering Department, Cleveland Electric Street Railway.
Schroll, Otto, 1886, C. E. Wheeling, West Virginia.	Superintendent, Wheeling Terminal R. R. Co.
Sedgwick, Edgar C., 1895, E. E. Columbus, Ohio.	Mechanical Draftsman, The Case Manufacturing Company.
Serva, Adam A., 1893, E. E. Ft. Wayne, Indiana.	Assistant Sales Manager, Fort Wayne Electric Works.
Sharp, Charles C., 1888, C. E. Boomer, West Virginia.	President Raven Coal and Coke Co. and Superintendent Boomer Coal and Coke Co.
Shepherd, Charles W., 1900, C. E. Chicago, Illinois.	With Structural Department, Illinois Steel Co.
Sherman, Chris. E., 1894, C. E. Columbus, Ohio.	Associate Professor, Civil Engineering, Ohio State University.
Simonton, Mark, 1895, E. E. Columbus, Ohio.	Treasurer and General Manager, Electrical Supply & Construction Company.
Skinner, Charles E., 1890, M. E. Pittsburgh, Pennsylvania.	Engineer, Electrical Engineering Department, Westinghouse Electric & Manufacturing Company.
Smith, David William, 1899, C. E. Columbus, Ohio.	Engineer, Hocking Valley Ry. Co.
Snider, Charles M., 1897, B.Sc. (I.A.). Columbus, Ohio.	Draftsman, The Jeffrey Mfg. Co.
Sperr, Frederick W., 1883, E. M. Houghton, Michigan.	Professor of Civil and Mining Engineering, Michigan College of Mines.
Sprague, Clarence M., 1899, C. E. Columbus, Ohio.	Assistant on Engineering Corps, P., C., C. & St. L. Ry., Indianapolis Division.
Spurrier, John Rudolph, 1896, E.E. Wilkinsburg, Pennsylvania.	Mechanical Engineering Department, Westinghouse Electric & Manufacturing Company.

Staley, Marcellus, 1899, E. E....	
Starbuck, Daniel Carl, 1899, E.E.	
Stewart, Harford T., 1896, E. E.. Columbus, Ohio.	Agent, General Electric Company.
Stewart, Lee Raymond, 1896, C. E. Camden, New Jersey.	Draftsman, New York Ship Building Company.
Stinebaugh, Isaac Long, 1892, C.E. Port Clinton, Ohio.	Deputy County Surveyor.
Stone, Carleton Elijah, 1899, C.E. Akron, Ohio.	Civil Engineer, with The Richland & Mahoning Railway Company.
Storer, Norman Wilson, 1891, E.E. Pittsburgh, Pennsylvania.	Westinghouse Electrical & Manufacturing Company.
Storer, Simon B., 1893, E. E..... Syracuse, New York.	Engineer and Salesman, Westinghouse Electric & Manufacturing Company.
Stull, Emmett Willett, 1894, E.E. Johnstown, Pennsylvania.	Engineer, Motor Department, Lorain Steel Company.
*Stump, John William, 1895, C.E.	Died May 31, 1900.

T

Taylor, Arthur W., 1893, E. M... Cleveland, Ohio.	Chemist, Otis Steel Company, Ltd.
Thomas, James O., 1897, C. E.... Columbus, Ohio.	Wire Chief, Central Union Telephone Company.
Tomlinson, James Rowe, 1892, C.E. Chicago, Illinois.	Assistant Engineer, C. & N. W. Ry.
Towne, Robert S., 1879, B. Sc.; 1880, E. M. New York City.	President, Companios Metalurgica Mexicana.

* Dead.

TUFTS, CHARLES HILL, 1889, E. M. Pittsburgh, Pa.	Assistant Chemist, Schoenberger Works, American Steel & Wire Company.
TURNER, ARTHUR M., 1893, E. E.. 281 Oak St., Chicago, Illinois.	

U

URBAN, HARRY M., 1898, C. E..... Pittsburgh, Pennsylvania.	Assistant on Engineer Corps, P., C., C. & St. L. R. R. Co.

V

VANDERVOORT, W. P., 1886, E. M...	
VIETS, WILLIS B., 1886, E. M..... Parryville, Carbon Co., Pa.	Chemist, Carbon Iron & Steel Co., Ltd.
VOSSKUEHLER, JOSEPH H., 1900, M.E. Miller School, Va.	Professor of Drawing in Miller Manual Labor School.

W

WADSWORTH, F. L. O., 1888, B. Sc.; 1889, E. M., M. E. Allegheny, Pennsylvania.	Director Allegheny Observatory.
WALKER, JAMES MADISON, 1896, C.E. Albion, Ind.	Assistant Resident Engineer, B. & O. R. R. Co.
WATT, SERN P., 1886, M. E..... Morgan Park, Illinois.	Vice-President and Mechanical Expert of Hine-Watt Manufacturing Company, Chicago, Ill.
WEICK, C. W., 1898, B. Sc. (I. A.). New York.	Manual Training, Teachers' College, Columbia University, New York.
WELCH, CLARK J., 1888, C. E.....	
WELCH, OLIVER BARTLETT, 1895, E.E. Dennison, Ohio.	General Manager, United Electric Company.
WILCOX ALVAN NEWTON, 1895, E.E.	
WIRTHWEIN, LOUIS P., 1899, C. E.. Columbus, Ohio.	In City Engineer's Office.

WISE, ALBERT JOSEPH, 1898, C. E.. Assistant Engineer, Cleveland & Indianapolis Division, C., C., C. & St. L. R. R.
Cleveland, Ohio.

WOLF, HERMAN HOWARD, 1895, C. E. Lieutenant, U. S. Revenue Cutter Service.
U. S. Steamer Galveston.

Z

ZAUMSEIL, OSCAR C., 1887, C. E... Merchant.
Webb City, Missouri.

ZURFLUH, WILLIAM N., 1894, E. E. Electrical Engineer and Contractor.
Springfield, Ohio.

List of Graduates from Other Colleges of the Ohio State University Who are now doing Engineering Work.

Bradford, Ernest, 1892, G. Ph.... Columbus, Ohio.	Analytical Chemist, with Prof. N. W. Lord.
Calkins, William B., 1898, G. Ph. New Straitsville, Ohio.	Chemist in Steel Works.
Converse, Howard P., 1887, B. Sc. Boston, Massachusetts.	Manager of the Boston Office, Cooper, Hewitt & Co., Steel and Iron Manufacturers.
Evans, Ernest, 1892, B. Sc..... Steubenville, Ohio.	Assistant Superintendent, Steel Works at Mingo Junction.
Heath, Arthur T., 1887, G. Ph.. Oak Harbor, Ohio.	Analytical Chemist, Consulting Engineer and Contractor.
Humphrey, J. Scott, 1879, B. Sc.. Alexandria, Indiana.	City Civil Engineer.
Jones, Jesse Lee, 1890, B. A..... Philadelphia, Pennsylvania.	In Charge of Testing Department, William Cramp & Sons, Ship Builders.
Kirker, Harry L., 1889, B. Sc.... Havre, France.	Electrical Engineer, Westinghouse Electric & Manufacturing Co.
Knopf, George W., 1883, B. Sc.... Pottstown, Pennsylvania.	Engineer, McClintic-Marshall Construction Company.
Lovejoy, Jesse R., 1884, B. Sc..... Schenectady, N. Y.	Manager, Lighting, Railway and Supply Department, General Electric Company.
McDowell, John A., 1882, B. Sc.. Columbus, Ohio.	Chemist, Specialty Portland Cement Manufacture.
Mix, Edgar W., 1888, B. Sc..... Paris, France.	Chief Engineer, Le Societe des Etablissments Postel-Vinay, La CieFrancaiseThompson-Houston.
Moyer, Henry E., 1893, B. Sc.... Youngstown, Ohio.	Chief Chemist, Youngstown Steel Company.

Newton, Harry S., 1889, B. Sc.... Beaver Falls, Pa.	General Manager, Beaver Valley Traction Company.
Phelps, Cyrus Alba, 1892, B. Sc.. San Jose de Ranchos, Sombrereto, Mexico.	Secretary, Cia Minera "Huinachie," S. A.
Ritchey, Joseph C., 1890, B. Sc... Mingo Junction, Ohio.	Junction Iron & Steel Company.
Scott, Charles Felton, 1885, B. A. Pittsburgh, Pennsylvania.	Chief Electrician, Westinghouse Electrical & Manufacturing Co.
Short, Sidney H., 1880, B. Sc..... 112 Cannon St., London, E. C., England.	Technical Director, English Electric Mfg. Co.
Smith, Burton Griffin, 1895, G.Ph. Detroit, Michigan.	Chemist, Ray Chemical Company.
Somermier, Edward E., 1898, G.Ph. Ohio State University.	Instructor in Metallurgy, Ohio State University.
Ward, John C., 1880, B. A..... Painesville, Ohio.	County Engineer and Surveyor.
Wikoff, John Burkett, 1884, B.Ph.. Cambridge, Ohio.	Manager, Cambridge Works, American Sheet Steel Co.

Directory of Those Who have Completed Short Courses.

CERAMICS.

Adams, John Carroll, 1897..... Lynchburg, West Virginia.	Timber Purchaser.
Berkey, Leslie Reese, 1899..... Bolivar, Pennsylvania.	Foreman, No. 4 Works, Reese, Hammond & Co., Fire Brick Makers.
Bleininger, Albert Victor, 1897.. Columbus, Ohio.	Instructor in Ceramics, Ohio State University.
Braddock, Everett F., 1896..... Richfield, Ohio.	
Campbell, Augustine Ray, 1898.. Tottenville, S. I., New York.	Chemist, Atlantic Terra Cotta Co.
Giessen, Carl, 1896..... Garfield, Ohio.	Superintendent Brick Works, Garfield, Ohio.
Gorton, Elmer Ellsworth, 1896.. Rome, Georgia.	Chemist and Superintendent, Rome Brick Co., Rome, Ga.
Hensel, Otto, 1897..... Chicago Heights, Illinois.	Chemist, Ludowici Roofing Tile Company.
Ittner, Warren Wayne, 1899..... Belleville, Illinois.	Superintendent of the Anthony Ittner Brick Company.
Jones, Edward F., 1896..... Zanesville, Ohio.	Kiln Burner, Mosaic Tile Co.
Post, Malcolm Phelps, 1899..... St. Louis, Missouri.	With Blackmer & Post.
Purdy, Ross C., 1898..... Zanesville, Ohio.	Chemist, Roseville Pottery Co.
Thomas, David C., 1896..... Wellsville, Ohio.	Chemist and Head Burner, U. S. Pottery Company.
Wolfley, John W., 1896..... Anderson, Indiana.	Burner, Columbia Encaustic Tile Company.
Worcester, Wolsey G., 1899..... Winton Place, Cincinnati, Ohio.	Superintendent, Cincinnati Roofing Tile & Terra Cotta Company.

MINING.

ANDERSON, ARTHUR, 1898.
Athens, Ohio.

BLOWER, J. W. 1892.
Bunola, Pennsylvania.

BOHM, OSCAR HERMAN, 1899.
Cleveland, Ohio.

BOYD, ARTHUR, 1893.
Mine Surveyor. Saginaw, Mich.

BROPHY, JOHN S., 1898.
Coopers, W. Va.

CARROLL, PATRICK, 1891.
Houtzdale, Pennsylvania.

DIXON, C. F., 1890.
Phillipsburg, Pennsylvania.

EVANS, JOHN M., 1895.
Shawnee, Ohio.

FYFE, JOHN, 1891.
Houtzdale, Pennsylvania.

GILDROY, R. E., 1891.
Whatcheer, Pennsylvania.

HARRIGAN, ARCHER, 1899.
New Castle, Pennsylvania.

HARRIGAN, PATRICK, 1898.
Jackson, Ohio.

HERRON, J. S., 1893.

JENKINS, JONATHAN, 1891.
Frostburgh, Maryland.

LAVIERS, HENRY, 1893.
Wellston, Ohio.

LOCHRIE, JOHN, 1890.
Houtzdale, Pennsylvania.

MCKEY, R. F., 1894.
Coal Glenn, Pennsylvania.

MOSS, JAMES, 1891.
Buffalo, Ohio.

NEWTON, E. A., 1893.
Jeffries, Pennsylvania.

NICHOLS, J. L. D., 1895.

OAKES, C. H., JR., 1892.
Pardoe, Pennsylvania.

PHILLIPS, F. R., 1893.
Laonoconing, Maryland.

QUIGLEY, JOHN, 1893.
Westville, Pennsylvania.

QUIGLEY, ROBERT, 1894.
Westville, Pennsylvania.

QUINN, JOHN, 1891.
Houtzdale, Pennsylvania.

RALSTON, WILLIAM, 1896.
Cleveland, Ohio.

REES, DAVID, 1891.

REES, EVAN, 1895.
Jacksonville, Ohio.

SNEDDEN, JAMES, 1892.
Antrim, Pennsylvania.

TETLOW, W. A., 1892.
Washingtonville, Ohio.

WRIGHT, JOHN, 1892.
Antrim, Pennsylvania.

University Bulletin Series 5 Number 13

OHIO STATE UNIVERSITY

CATALOGUE OF THE

COLLEGE OF PHARMACY

1901-1902

COLUMBUS
PUBLISHED BY THE UNIVERSITY

Entered at the Postoffice, Columbus, Ohio, as second-class matter

OHIO STATE UNIVERSITY

CATALOGUE

OF THE

COLLEGE OF PHARMACY

1901-1902

COLUMBUS
PUBLISHED BY THE UNIVERSITY

ARMORY AND GYMNASIUM
BIOLOGICAL HALL
TOWNSEND HALL
UNIVERSITY HALL
ORTON HALL

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DAYS AND DATES

1901

Entrance Examinations (8 A. M.)	Monday,	September 16.
Registration Day	Tuesday,	September 17.
Lectures and Class-work begin	Wednesday,	September 18.
Thanksgiving Recess	Thursday,	November 28.
	Friday,	November 29.
First Term ends	Wednesday,	December 18.

Christmas Vacation.

1902

Second Term begins—Registration Day	Thursday,	January 2.
University Day	Saturday,	February 22.
Second Term ends	Friday,	April 4.

Spring Recess.

Third Term begins—Registration Day	Wednesday,	April 9.
Field Day—Athletic Association	Saturday,	May 17.
Senior Vacation begins	Saturday,	May 24.
Competitive Drill—Cadet Battalion	Saturday,	May 24.
Memorial Day	Friday,	May 30.
Final Examinations	Monday to	June 9.
	Friday,	June 13.
Baccalaureate Sermon	Sunday,	June 15.
Entrance Examinations (8 A. M.)	Monday,	June 16.
	Tuesday,	June 17.
Class Day	Monday,	June 16.
Alumni Day	Tuesday,	June 17.
COMMENCEMENT	Wednesday,	June 18.

Summer Vacation.

Entrance Examinations (8 A. M.)	Monday,	September 22.
Registration Day	Tuesday,	September 23.
Lectures and Class-work begin	Wednesday,	September 24.
Annual Address by the President (11 A. M.)	Friday,	September 26.

FACULTY OF THE COLLEGE OF PHARMACY

REV. WILLIAM OXLEY THOMPSON, D. D., LL. D.....University Grounds
President of the University.

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Professor of Pharmacy, and Dean of the College of Pharmacy.

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Professor of Agricultural Chemistry.

BENJAMIN FRANKLIN THOMAS, PH. D.....University Grounds
Professor of Physics.

ROSSER DANIEL BOHANNAN, B. Sc., C. E., E. M...Sixteenth and Indianola Avenues
Professor of Mathematics.

ERNST AUGUST EGGERS.....University Grounds
Professor of the Germanic Languages and Literatures.

ALBERT MARTIN BLEILE, M. D.....218 King Avenue
Professor of Anatomy and Physiology.

WILLIAM ASHBROOK KELLERMAN, PH. D.....175 West Eleventh Avenue
Professor of Botany.

JOSEPH VILLIERS DENNEY, B. A.....230 West Tenth Avenue
Professor of Rhetoric and the English Language.

WILLIAM McPHERSON, D. Sc., PH. D.....65 Hamilton Avenue
Professor of Chemistry and Secretary of the College of Pharmacy.

GEORGE WASHINGTON McCOARD, M. A.....325 West Sixth Avenue
Associate Professor of Mathematics.

CHARLES WALTER MESLOH, M. A.....University Grounds
Associate Professor of the Germanic Languages and Literatures.

ARTHUR WINFRED HODGMAN, A. M., PH. D.....164 West Ninth Avenue
Associate Professor of Classic Languages.

CHARLES SMITH PROSSER, M. S.....1362 Highland Street
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JOHN ADAMS BOWNOCKER, D. Sc.....1594 Neil Avenue
Associate Professor of Inorganic Geology and Curator of the Museum.

JAMES ELSWORTH BOYD, M. Sc.....25 East Maynard Avenue
Assistant Professor of Physics.

WILLIAM LUCIUS GRAVES, M. A.....1313 Forsythe Avenue
Assistant Professor of Rhetoric.

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Assistant Professor of Pharmacy.

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Assistant Professor of Analytical Chemistry.

CHARLES LINCOLN ARNOLD, M. Sc.....328 West Eighth Avenue
Assistant Professor of Mathematics.

KARL DALE SWARTZEL, M. Sc.....57 East Eighth Avenue
Assistant Professor of Mathematics.

JOHN HENRY SCHAFFNER, A. M., M. Sc.....61 West Eleventh Avenue
Assistant Professor of Botany.

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Assistant Professor of Pharmacy.

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Assistant Professor of Classic Languages.

FREDERICK KESTER, M. E. in E. E.....1473 Neil Avenue
Instructor in Physics.

ALBERT EARL VINSON.....134 West Ninth Avenue
Assistant in Agricultural Chemistry.

EDWARD EVERETT SOMERMEIER, G. Ph.....1590 Neil Avenue
Assistant in Metallurgy and Mineralogy.

EDGAR HOWARD MOORE, B. Sc.....475 West Fourth Avenue
Assistant in German.

FRED J. TYLER, B. Sc.....43 East Ninth Avenue
Assistant in Botany.

MELVIN DRESBACH, B. Sc.....236 West Eighth Avenue
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*Absent on leave.

WILBUR LATIMER DUBOIS, B. Sc.....61 West Eighth Avenue
Fellow in Chemistry.

CLARENCE PHILANDER LINVILLE, B. Sc.....61 West Eighth Avenue
Fellow in Chemistry.

NILE O. FORD, B. A.....61 West Eleventh Avenue
Fellow in Metallurgy and Mineralogy.

WILLIAM E. BOHN, M. A.....43 West Eighth Avenue
Fellow in Rhetoric and English Language.

CHARLES HUBBELL KIMBERLY, B. Sc.....1300 Neil Avenue
Fellow in Chemistry.

HARRIET G. BURR, B. A.....1454 Highland Street
Fellow in Botany.

JOHN F. TRAVIS, B. A.....239 West Tenth Avenue
Fellow in Mathematics.

WALTER FISCHER, B. Sc.....810 Franklin Avenue
Fellow in Botany.

HERBERT B. BROOKS.....477 West Seventh Avenue
Fellow in Physics.

ROYAL A. ABBOTT, B. Ph.....1364 Forsythe Avenue
Fellow in Rhetoric and English Language.

CHRISTOPHER P. LINHART.....The Vendome
Professor of Physical Education and Director of the Gymnasium.

OLIVE B. JONES.....53 Eleventh Avenue
Librarian.

CAPTAIN GEORGE L. CONVERSE (U. S. A.).....398 Oak Street
Professor of Military Science and Tactics.

VIEW NEAR THE SPRING

HAYES HALL

BOTANICAL HALL

HORTICULTURAL HALL

THE OHIO STATE UNIVERSITY

Under an act of congress passed July 2, 1862, the State of Ohio received from the United States a large grant of the public lands for the purpose of establishing a "college where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such a manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." In accordance with this act, the Ohio State University was founded by the State, as a public institution of learning. The governing body of the institution is a Board of Trustees, appointed by the Governor of the State for terms of seven years, as provided in the law organizing the University. The original endowment has been supplemented, and the objects of the University promoted, by a permanent annual grant from the United States, under an act of 1890, by special appropriations of the General Assembly; and in 1891, by a permanent annual grant from the State, which grant was doubled by the Legislature of 1896. Through the aid which has been received from the United States and from the State it is enabled to offer its privileges, with a slight charge for incidental expenses, to all persons of either sex who are qualified for admission.

The University is situated within the corporate limits of the city of Columbus, two miles north of the Union Depot and about three miles from the State Capitol. It may be reached by either the North High street or the Neil avenue electric cars. The grounds consist of three hundred and forty-five acres. The western portion, about 235 acres, is devoted to agricultural and horticultural purposes. The eastern portion is occupied by the principal University buildings, campus, athletic and drill grounds, a park like meadow and a few acres of primitive forest.

The University has thirteen buildings devoted to instruction, one boiler house, one power house, two dormitories, six residences and some farm buildings. These buildings represent an investment for construction of about $800,000. The equipment and apparatus amount to $170,000. The land now occupied as a site with the farm is valued at $1,500,000.

The University is divided into six colleges, as follows:

The College of Agriculture and Domestic Science.
The College of Arts, Philosophy and Science.
The College of Engineering.
The College of Law.
The College of Pharmacy.
The College of Veterinary Medicine.

Each of the above named colleges is under the direction of its own faculty, which has power to act in all matters pertaining to the work of the students of that particular college.

CHEMICAL HALL

THE COLLEGE OF PHARMACY

The Department of Pharmacy was created at the University immediately after the passage of the state law requiring the examination and registration of all persons desiring to engage in the practice of pharmacy. Later, when the growth of the University made it advisable to form separate colleges, the College of Pharmacy was established. This college endeavors to offer to the student every facility for thorough training in all that pertains to the subject of pharmacy.

The necessity of special technical training on this subject is now generally recognized and indeed without it there can be no true success in the calling. The opportunites for profitable employment to the skilled pharmaceutical chemist are many and his services are in constant demand. In addition to his usual work as prescriptionist and dispensing chemist he is often found employed as chemist to the physician, expert in manufacturing establishment, general analyst, sanitary expert or in one of the many lines of industrial chemistry.

THE COURSES

Two courses of study are offered in this college, viz : The Short Course, extending over a period of two collegiate years ; and the Long Course, extending over a period of four collegiate years. The object of the Short Course is to train students for the general work of the dispensing pharmacist. It fully meets the requirements of the State Board of Pharmacy and students completing it find no difficulty in securing registration. The Long Course, on the other hand, furnishes much more extensive and more thorough training, thus enabling the graduates to successfully follow any line of chemical or pharmaceutical work.

ADMISSION

The University is open on equal terms to both sexes. The entrance examinations for 1901 will be held on Monday and Tuesday, June the 16th and 17th, and Monday, September the 22nd.

Applicants for admission to the College of Pharmacy must be at least sixteen years of age and must be provided with credentials of scholarship from their last instructors or from the last institution with which they have been connected, and with a certificate of good moral character.

There are three modes of admission to the University :

1. Certificates of the preparatory departments of colleges of approved standing and of normal schools in Ohio are accepted, if found satisfactory, in lieu of examination for preparatory studies, under the following conditions:

Each certificate must contain a detailed statement of the studies pursued, the text books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination, and the applicant's rank or standing in it. A copy of the course of study should accompany the certificate ; and both should be sent to the University not later than the first of September. The University cannot promise this recognition to those certificates presented during entrance week.

Blank certificates will be furnished on application

Applicants for admission who come from other colleges or universities are required to bring certificates of honorable dismissal.

Teachers' certificates in force will be accepted at their face value.

2. From time to time the University approves the course of study in certain High Schools of the State ; and the graduates of these High Schools are admitted on presentation of diplomas or certificates in accordance with the following rules :

Rule 94. Such diplomas and certificates shall be accepted in lieu of examination for preparatory studies only under the following conditions :

(a) The certificate must state in detail the studies pursued, the text-books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination in it, and the rank or standing of the candidate in it.

(b) The certificate will be accepted for such studies only, or such part of each, as it shall show to have been satisfactorily accomplished.

(c) Every such certificate must be accompanied with a diploma showing that the candidate has completed the course of study in the school from which he comes. But the General Faculty may except from this condition schools whose work is known to be exceptionally good, provided that the candidate has attended the school two full years.

(d) In case the authorities of any high school, academy or normal school in Ohio desire to have a definite standing fixed for the admission of its graduates, a committee of the General Faculty will visit the school, and on the report of this committee a standing will be fixed for the graduates of the school. Such standing shall not be good, without re-examination, after three years.

(e) Whenever, after a sufficient trial, it becomes evident that the graduates of any school are not adequately prepared, the diploma and certificate of such school will no longer be accepted.

3. All other applicants are subject to examination on the studies mentioned below.

Full equivalents for the text-books named will be accepted.

THE CHAPEL

THE GYMNASIUM

FOR ADMISSION TO THE LONG COURSE[1]

The following are the requirements :

1. *Arithmetic, Descriptive and Physical Geography, English Grammar, and United States History.*

2. *English Composition and English Classics.*—Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of several brief essays, of which one will be upon a subject drawn from the applicant's observation or experience, and the others upon topics requiring a knowledge of the following books, or equivalents : Shakespeare's *Merchant of Venice*, *Julius Caesar* and *Macbeth ;* Milton's *Lycidas*, *Comus*, *L'Allegro*, *and Il Penseroso ;* Burke's *Conciliation with the Colonies ;* Macauley's *Essays on Milton and Addison ;* The Sir Roger de Coverly Papers in *The Spectator ;* Goldsmith's *The Vicar of Wakefield ;* Coleridge's *The Ancient Mariner ;* Scott's *Ivanhoe ;* Carlyle's *Essay on Burns ;* Tennyson's *The Princess ;* Lowell's *The Vision of Sir Launfal ;* George Eliot's *Silas Marner.*

To meet the English requirement the schools should provide courses in composition-practice and courses in English classics extending side by side through the preparatory years.

In the courses in composition, pupils should be afforded regular and abundant practice in preparing narrative, descriptive, expository and argumentative themes, and should be familiarized with those principles of Rhetoric which are most helpful in composition, such as the principle of sentence-structure, outlining, paragraphing, and choice of words. Scott and Denney's Composition-Rhetoric is recommended as a guide. The study of specimens of bad English from a text-book is not recommended; in order to insure accuracy, a considerable amount of the written work of the pupils should be corrected by the teacher and revised and rewritten by the pupils themselves. Some of the composition-work may be based upon the reading prescribed above, but much of it should be based upon the observation and experience of the pupils.

In the course in English classics, pupils should read the prescribed books with sufficient care to become familiar with the plot, incidents and characters of all of them and should also learn something of their authors and of their places in literary history. A few of these books, or portions of all of them, should be examined closely with reference to form, structure, method, language, and leading characteristics of style. The voluntary outside reading of additional books should be encouraged by the teacher. In connection with all of the reading it is recommended that the memorizing of notable passages of prose and poetry be required.

1 An applicant for admission who may be somewhat in arrears in any given subject, will find opportunity to make up this work in the Columbus High Schools, which are fully accredited by the University, but no applicant for admission to the Long Course will be accepted who is deficient or conditioned in required entrance work representing in the aggregate more than one daily recitation for a year.

3. *Algebra*—Taylor's Academic or equivalent.

4. *Botany*—Kellerman's Elementary Botany and Spring Flora or equivalent.

5. *Civil Government*—Fiske or Thorpe preferred.
Or History—Myers' *General History*.

6. *Geometry, Plane and Solid*—Venable, White, Wentworth, Wells, or any other reputable book.

7. *Latin*—Pronunciation (the Roman Method); Grammar (an exact knowledge of the inflections is essential); Cæsar, the first three books of the *De Bello Gallico*.

Or *German*—Joynes-Meissner's or Thomas' Grammar is recommended. The essentials in these grammars should have been mastered thoroughly, i. e., declensions of nouns and adjectives, pronouns, comparison of adjectives, prepositions, regular and irregular verbs and essentials of syntax.

The following books or their equivalents must have been read (not less than 600 pages.) Joynes's or Whitney's Reader; Hillern's Höher als die Kirche; Riehl's Der Fluch der Schöenheit; Freytag. Die Verlorne Handschrift; Gerstäcker Irrfahrten.

For the present, the *German* required for admission may be begun at the University, but without University credits.

8. *Physics*—Carhart and Chute, Gage, Avery, or Appleton.

ADMISSION TO SHORT COURSE

Candidates for admission who are less than twenty-one years of age, must be prepared in the common English branches. Teachers' certificates (in force), or credentials from approved schools, will be accepted in lieu of an examination.

ADMISSION TO SPECIAL STUDIES

Students who desire to pursue special lines of work in the University, and do not desire to become candidates for degrees, will be admitted on the following conditions:

1. The regular entrance requirements must be satisfied.

But applicants who are not less than eighteen years of age, after obtaining credit for elementary or "grade" work, and for such other subjects as may be necessary to qualify them for the classes that they wish to enter, may, on the presentation of satisfactory reasons, be admitted by the Faculty to any class in the college; provided, that if any student who has been admitted on these conditions afterwards becomes a candidate for a degree, he shall take the omitted entrance examinations at least twelve months before the degree is conferred.

2. On entering the college, students desiring to pursue special work are required to lay before the faculty, for approval or modification, a written

statement of the end they have in view, the studies proposed for the attainment of that end, and the probable period of attendance. Such students will be held as strictly to their accepted schemes of work as are the regular undergraduates to their courses of study.

3. Permission to enter as special undergraduates will be refused to all who fail to give satisfactory evidence of definiteness of purpose and will be withdrawn whenever the conditions on which it was granted cease to exist.

LONG COURSE

This course has been prepared to meet the growing demand for men thoroughly trained in all lines of pharmaceutical work. Its graduates are not only thoroughly grounded in the principles and practice of Pharmacy, but also have a comprehensive knowledge of the allied sciences. They are thus able to enter wider fields of industry and to fill more responsible positions.

The course is mainly compulsory, only a small amount of elective work being offered in the fourth year. The greatest amount of time is devoted to Chemistry and Pharmacy. The chemical work begins in the first year with elementary chemistry and qualitative analysis, following in the second year with quantitative analysis. A full year is then devoted to the important subject of organic chemistry. In the fourth year the student is given the opportunity to choose between a number of courses, as: sanitary analysis, metallurgical chemistry, agricultural chemistry and advanced special work. Toxicology is required. The work in Pharmacy proper does not begin until the second year of the course. An entire year is devoted to the study of the methods and preparations of the Pharmacopœia. Another year to unofficial preparations, prescription practice and dispensing, and pharmaceutical assaying. The last year to a study of the alkaloids, the synthetic preparations, and to pharmaceutical chemistry.

On account of the large amount of chemical literature printed in German, this language is made compulsory.

The courses in Physics, Physiology and Botany are arranged to furnish the student with such training in these sciences as will have a practical bearing upon the work of a pharmacist.

As a requisite for graduation, each candidate must present an acceptable thesis, embodying the results of a special study. The subject of this study must lie within the field of Pharmacy, and must be announced to the President of the University (dependent upon the approval of the head of the department), not later than the beginning of the second term of the fourth year; and the completed thesis must be presented in duplicate, on standard paper of certain size and quality, typewritten, bound and titled, not later than the second Saturday before commencement day.

On the satisfactory completion of the course, the student is granted the degree of Bachelor of Science (B. Sc.) in Pharmacy.

LONG COURSE

Degree—Bachelor of Science in Pharmacy

Note—The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

First Term	Credit hours	Second Term	Credit hours	Third Term	Credit hours
Chemistry (7) Inorganic.	5	Chemistry (7) Inorganic.	5	Chemistry (12) Qualitative Analysis.	4
Latin (1) Pharmaceutical.	5	Latin (1) Pharmaceutical.	5	Latin (1) Pharmaceutical.	5
or		or		or	
German (1) Elementary.	4	German (1) Elementary.	4	German (1) Elementary.	4
Mathematics (14) Plane Trigonometry.	5	Mathematics (15) (16) Analytical Trigonometry. Algebra.	5	Mathematics (17) Plane Analytics.	5
Rhetoric (1) and (2) Paragraph Writing.	2½	Rhetoric (1) and (2) Theme Writing.	2½	Rhetoric (1) and (2) Prose Analysis.	2½
Cadet Service (men)		Cadet Service (men)		Cadet Service (men)	
Hygiene and Physical Training (women)		Hygiene and Physical Training (women)		Hygiene and Physical Training (women)	

SECOND YEAR

Botany (3) Systematic, Physiological.	5	Botany (4) Medical.	2	Chemistry (20) Laboratory.	4
Chemistry (20) Laboratory.	4	Chemistry (20) Laboratory.	4	German (2) Scientific Reading.	2
German (2) Scientific Reading.	2	German (2) Scientific Reading.	2	Pharmacy (8) Dispensatories, etc.	5
Pharmacy (6) Gen'l Processes.	3	Pharmacy (7) U. S. Pharmacopoeia.	5	Physics (11) General Physics.	3
Physics (11) General Physics.	3	Physics (11) General Physics.	3	Metallurgy (2) Mineralogy.	3
Chemistry (21) Advanced Inorganic and Physical.	2	Chemistry (21) Advanced Inorganic and Physical.	2	Chemistry (21) Advanced Inorganic and Physical.	2
Cadet Service (men)		Cadet Service (men)		Cadet Service (men)	
Hygiene and Physical Training (women)		Hygiene and Physical Training (women)		Hygiene and Physical Training (women)	

THIRD YEAR

Pharmacy (9) General Processes.	5	Pharmacy (10) Prescriptions.	5	Pharmacy (11) Dispensatories, etc.	5
Pharmacy (12) Materia Medica.	3	Pharmacy (13) Materia Medica.	3	Pharmacy (14) Mat. Medica & Thera.	3
Physiology (1) Human Anatomy.	3	Physiology (1) Physiology.	3	Physiology (1) Physiology.	3
		Physiology (8) Bacteriology.	2	Physiology (5) Microscopy.	2
General Chemistry (8) Organic.	5	General Chemistry (9) Laboratory.	5	General Chemistry (9) Laboratory.	5

FOURTH YEAR

Geology (5) General.	5	Geology (6) Economic.	3	General Chemistry (11) Toxicology.	4
Pharmacy (15) Assaying.	5	Pharmacy (16) General.	5	Pharmacy (17) General.	5
Thesis.		Thesis.		Thesis.	

Elective, eight or, by special permission of the Professor of Pharmacy, nine hours through the year—five hours of which must be chemistry.

CHEMICAL LECTURE ROOM

SHORT COURSE

This course is arranged for students who wish to prepare themselves in as short a time as possible for the duties of the dispensing pharmacist. It is also possible for students to enter this course who cannot meet the entrance requirements of the long course. Students who complete the work satisfactorily will have no trouble in passing the examination given by the State Board of Pharmacy.

The greatest amount of time is devoted to Chemistry and Pharmacy, both of which are studied throughout the course. The student also acquires sufficient knowledge of Latin to enable him to understand pharmaceutical and medicinal terms. Physics, Physiology and Botany receive due attention.

On the satisfactory completion of this course the student is granted a certificate of "Pharmaceutical Chemist."

SHORT COURSE

NOTE—The figure in parenthesis following the name of each study indicates the number of the study in its department. A full description of department work follows this statement of Courses.

FIRST TERM.	Credit hours	SECOND TERM.	Credit hours	THIRD TERM.	Credit hours
Chemistry (7) Inorganic.	5	Chemistry (7) Inorganic.	5	Botany (1) Elementary.	5
Latin (1) Pharmaceutical.	5	Latin (1) Pharmaceutical.	5	Chemistry (12) Qualitative Analysis.	4
Physics (1) Elementary.	5	Physics (1) Elementary.	5	Latin (1) Pharmaceutical.	5
Pharmacy (6) General Processes.	3	Pharmacy (7) U. S. Pharmacopoeia.	5	Pharmacy (8) Dispensatories, etc.	5
Cadet Service (men)		Cadet Service (men)		Cadet Service (men)	
Hygiene and Physical Training (women)		Hygiene and Physical Training (women)		Hygiene and Physical Training (women)	

SECOND YEAR

Botany (3) Systematic, Physiological.	5	Botany (4) Medical.	2	Chemistry (11) Toxicology.	4
Chemistry (8) Organic.	5	Chemistry (22) Organic.	5	Chemistry (17) Inorganic Preparations.	4
Pharmacy (9) Phar. Chemistry.	5	Pharmacy (10) Prescription Practice.	5	Pharmacy (11) Dispensing Practice.	5
				Physiology (1) Physiology.	3
Physiology (1) Human Anatomy.	3	Physiology (1) Physiology.	3	Physiology (5) Microscopy.	2
		Physiology (8) Bacteriology.	2		
Cadet Service (men)		Cadet Service (men)		Cadet Service (men)	
Hygiene and Physical Training (women)		Hygiene and Physical Training (women)		Hygiene and Physical Training (women)	

AGRICULTURAL CHEMICAL LABORATORY, TOWNSHEND HALL

PHYSIOLOGICAL LECTURE ROOM, BIOLOGICAL HALL

DEPARTMENTS OFFERING INSTRUCTION IN THE COLLEGE OF PHARMACY— DESCRIPTION OF EQUIPMENT AND COURSES

AGRICULTURAL CHEMISTRY

(Townshend Hall, Rooms 29, 35, 34 and 30)

PROFESSOR WEBER, MR. VINSON.

The rooms occupied by the Department of Agricultural Chemistry are situated on the second floor of Townshend Hall. The north end contains a large student laboratory with ninety-two desks. Each student is assigned a desk. The desks are supplied with combination locks for the purpose of securing the outfit of chemicals and apparatus. The arrangements for water, gas and hoods are convenient. Connected with this laboratory are a balance room, a room for organic analysis, a store room and a private laboratory.

The lecture room, capable of seating one hundred and fifty to two hundred students, with a preparation room adjoining, is situated in the south end.

There is also a room, detached from all other laboratories, fitted up for water analysis and polariscopic work in sugar analysis. Besides the usual desk outfit, students are supplied with all necessary apparatus for conducting their required work.

Lectures and Laboratory. In the second term two hours a week are devoted to lectures on the industries related to agriculture, as the manufacture of sugar from cane, sorghum and beets; the manufacture of starch, glucose and dextrine; the nature and manufacture of vinegar, as fruit, malt and distilled vinegar; the manufacture of alcohol, malt liquors and wines. In the laboratory the work consists of the official methods of analyzing fertilizers, feeding stuffs, milk, butter and cheese; the analysis of sugars, syrup and sugar-producing plants, as beets; determination of cane sugar, milk sugar, reducing sugar and dextrine; also the determination of cane sugar and milk sugar by the polariscope; the analysis of vinegar, as cider, malt and distilled vinegar; the analysis of spiritous and fermented liquors. Three or four times a week throughout the year. (Elective.)

6. **Laboratory.** The work of this course consists of the complete sanitary analysis of water, for which a special room detached from the main laboratory has been fitted up; the complete analysis of soils; the various official methods for determining nitrogen, potash and phosphoric acid; the analysis of oils and fats; complete analysis of grain; the analysis of tea and coffee; the examination of foods, drinks, spices, condiments, flavoring extracts, etc., for adulteration; also any work of previous courses, which for lack of time may not have been completed. Three or five times a week throughout the year. (Elective.)

ANATOMY AND PHYSIOLOGY

(Biological Hall, Rooms 12 and 20)

PROFESSOR BLEILE, ASSISTANT PROFESSOR MORREY, MR. DRESBACH.

The new quarters recently provided for this Department are commodious, well lighted and ventilated.

The equipment of the Department consists of Azoux and other models, charts, microscopes, skeletons and apparatus, necessary for experimentation and demonstration.

The bacteriological laboratory is provided with all necessary incubators, sterilizers, culture dishes and so on, and several first class microscopes in addition to the ordinary students' stands are available for the study of the finer forms.

1. **Human Anatomy and Physiology.** Instruction is given by lectures, demonstrations and recitations. A limited amount of laboratory work is also introduced so that the student may personally familiarize himself with the more fundamental facts presented in the lecture room. Incidental to the main work so much of anatomy and histology is given as will render the processes going on in the body comprehensible. Three times a week throughout the year. (Required in both Long and Short Courses.)

8. **Bacteriology.** This subject is taught during the winter term. The first half is taken up by lectures and recitations; the latter half is devoted to laboratory work. Bacteria are first studied in a general way and in their general relationships in nature. Then some of the more specific relations to disease and other processes of interest to the pharmacist are taken up. In the laboratory is taught the preparation of culture media, the methods for study of these organisms, water and sputum examinations and the isolation of pure culture. Two hours a week. (Required in both Long and Short Courses.)

5. **Microscopy and Urinary Analysis.** Instruction includes the theory of the microscope to insure the rational and scientific use of this instrument and discussion of the methods for the preparation of microscopic

A CORNER IN THE BOTANICAL LABORATORY

BACTERIOLOGICAL LABORATORY, BIOLOGICAL HALL

objects and their study. The urine is studied as to its normal constituents, these being determined qualitatively and quantitatively. Pathological urines are next studied and the variations from the normal are interpreted. Laboratory work also makes up a large part of this course. Two hours a week during the Third Term. (Required in both Long and Short Courses.)

BOTANY

(Botanical Hall)

PROFESSOR KELLERMAN, ASSISTANT PROFESSOR SCHAFFNER, MR. TYLER, FLORIST LUKE, MISS BURR, MR. FISCHER.

This Department offers good facilities for instruction and investigation in pharmaceutical Botany.

Besides the large lecture room, the Botanical Building contains a Museum, an Herbarium, three laboratory rooms, a dark room, drying room, a store room and offices. The lecture room will the coming year contain a stereopticon furnished with electric light; a large number of charts, many of them colored—lithographic, photographs and mounted illustrative specimens are the other appliances for daily class work. In this room are placed fifteen of the more important popular journals of Botany for the use of students. The Botanical books in the University Library, a valuable and growing collection, are largely used for reference in connection with the several courses. The Museum contains a large amount of illustrative material, the native medicinal plants, and a very complete collection of Ohio woods.

The State Herbarium consists of about sixteen thousand sheets of mounted plants. The general herbarium is much larger. Prof. Kellerman's private herbarium of twenty thousand specimens, mostly parasitic fungi, is also used by the Department. The large Laboratory is well equipped with dissecting and compound microscopes, also the usual appliances for doing both elementary and advanced histological work. One of the small laboratories is devoted to experimental work in vegetable physiology and the other to systematic botany. The green-house attached to the Botanical Building is an important adjunct to the Department. There are four sections containing a total of nearly 3,000 feet of glass. There is a large number of illustrative plants, perhaps three thousand specimens, representing the principal plant families and belonging to several hundred species. The green-house furnishes much fresh material for laboratory use. It is also used as a laboratory to carry on special work when growing plants are used.

1. **Elementary Botany.** This course deals largely with organography and physiology of plants. Much attention is given in the latter part of the course to the native flora. The students are required to make an herbarium of the medicinal plants, noting especially the part used in medicine. The text book used is Kellerman's Elementary Botany and Spring Flora. Three

days of each week are devoted to recitations from the text with occasional lectures or oral work and frequent reviews and examinations. The other two days are occupied with elementary laboratory work mostly with the aid of dissecting microscopes, using note book and drawing tablet. Third term. (Required in Short Courses.)

3. **Systematic and Physiological Botany.** This course deals more fully with Ecology and Physiology, also Morphology and Classification. The plant as a living organism is the main point of view. The students are required to add to their herbariums begun in the Spring term and thus obtain a full set of the native medicinal plants. About half of the time of the course is devoted to observation in the field, and laboratory work. The latter gives a thorough drill in the use of the microscope and modern methods in technique. It aims to acquaint the student with the vegetable cell and tissues and their development and functions. Five times a week. First term. (Required in both Long and Short Courses.)

4. **Medical Botany.** This course is devoted exclusively to laboratory study of the medicinal plants and vegetable products used in medicine. Maisch's Organic Materia Medica is mainly followed. Each student is required to make mounts of the materials studied; these he retains for his own use in the future. Some practice is given in detecting adulterations. Twice a week. Second term. (Required in both Long and Short Courses.)

16. **Laboratory Work.** In this course the student undertakes special investigations on medicinal plants, poisonous plants, adulterations, etc. Two to five times a week. Three terms (Elective.)

CHEMISTRY

[Chemical Hall, Rooms 24, 25, 14, 21, 22, 7 and 18]

PROFESSOR MCPHERSON, PROFESSOR NORTON, ASSISTANT PROFESSOR HENDERSON, MR. GORE, MR. LINVILLE, MR. DUBOIS, MR. KIMBERLY

The Department of Chemistry occupies the larger portion of the Chemical Hall. The main lecture room is situated on the second floor and has a seating capacity of one hundred and seventy-five persons. There are four main laboratories; one for students in elementary chemistry and qualitative analysis, accommodating two hundred and fifty; one for quantitative analysis with desks for fifty; one for advanced qualitative and sanitary analysis and one for organic chemistry, each with accommodations for twenty. In addition to these, there is an office, a balance room, three private laboratories and several smaller rooms used for combustion work, spectroscopic work and private investigations.

The laboratories are equipped with all the modern conveniences as water, gas, steam ovens, drying ovens, automatic air blasts, electric lights, etc. Distilled water is piped from the large still in the attic to each room.

LABORATORY FOR QUANTITATIVE ANALYSIS

LABORATORY FOR ELEMENTARY CHEMISTRY

Each student has his own desk with drawers and locker. All supplies are obtained from the chemical store room which is liberally provided with all the apparatus and material necessary for chemical investigations.

The Department is also well equipped with all apparatus necessary for experimentally illustrating the class room work. The main lecture room is furnished with cases which contain a large collection of specimens for purposes of illustration.

7. **Elementary Chemistry.** Inorganic. Lecture, Laboratory and Quiz. Laboratory work; first term, experiments upon the non-metals; second term, principles of qualitative analysis. Five times a week. Second and third terms. (Required in both courses.)

8. **Organic Chemistry.** Lectures. Five times a week. First term. (Required in both Courses.)

9. **Organic Chemistry.** Laboratory and recitations. Five times a week. Second and third terms. (Required in Long Course.)

11. **Toxicology.** Lectures. Poisons—their effects, antidotes and detection. Four times a week. Third term. (Required in both Courses.)

12. **Qualitative Analysis.** Four times a week. Third term. (Required in both Courses.)

15. **Sanitary Analysis.** Laboratory and lectures. A study of the most important chemical methods for the analysis of water and air. Four times a week. Third term. (Elective.)

16. **Applied Chemistry.** Lectures on Industrial Chemistry. These are made as practical as possible by visits to different chemical works. When possible specialists deliver lectures on subjects belonging to their particular line of work. Four times a week. Second term. (Elective.)

17. **Inorganic Preparations.** This course includes the preparation of chemically pure inorganic substances from the crude materials. Four times a week. First term or third term. (Elective.)

20. **Quantitative Analysis.** Laboratory, lectures and recitations. Use of the balance and general principles of gravimetric analysis. Drill in the solution of problems in quantitative analysis; study of properties of precipitates; principles of volumetric analysis. Selections are made from such analytical methods as best meet the needs of the students. The samples used for analysis are mixtures or commercial products, the percentage composition of which is not made known to the student until he has reported his own results. Four times a week. Three terms. (Required in Long Course.)

21. **Advanced General Chemistry;** Physical Chemistry. This course includes (*a*) a general survey of inorganic chemistry based upon the arrangement of the elements in accordance with the Periodic Law and (*b*) a

LABORATORY FOR ORGANIC CHEMISTRY

LABORATORY FOR ADVANCED WORK IN PHARMACY

discussion of the main principles of Physical Chemistry and their application to general chemical processes. Twice a week. Three terms. (Required in Long Course.)

22. **Organic.** Laboratory. The preparation of some of the important compounds used in medicine. Five times a week. Second term. (Required in Short Course.)

GEOLOGY

(Orton Hall, Rooms 5, 4, 7 and 13)

ASSOCIATE PROFESSOR PROSSER, ASSOCIATE PROFESSOR BOWNOCKER.

Orton Hall, completed at a cost of more than $100,000, is designed for the permanent accommodation of the large geological collection of the University and for work and instruction in the Department of Geology. The building is two stories in height, with a high basement, is built of brick and faced with sandstone and is fire-proof throughout. Nearly all of the finer varieties of Ohio building stone are represented in the columns, walls and ceiling panels of the vestibule. At the right of the main entrance is the geological lecture room and professor's private room, while the central and rear portions are occupied by the geological and paleontological museum, with a museum of economic geology in the basement. At the right on the second floor are the laboratories of historical geology and petrography and professor's private room.

The Department has all the specimens collected by the State Geological Survey and this comprises a good representation of all the Ohio geological formations. The more important collections are as follows:

1. Rock specimens illustrating the principal phases of each Ohio formation.

2. Collections of animal and vegetable fossils in which are a majority of the described species from the Ohio formations.

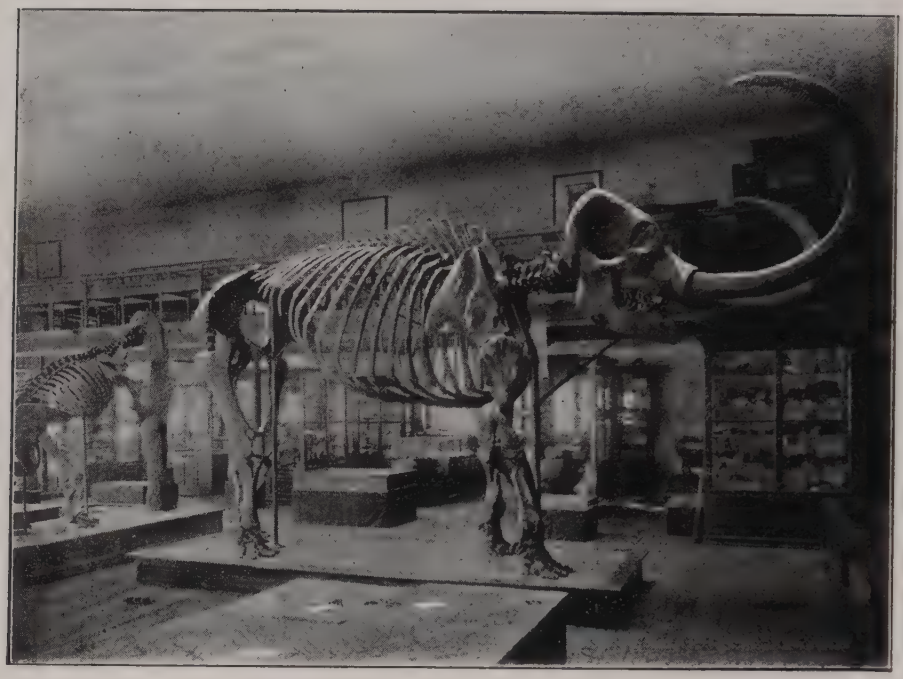
3. The economic minerals of the state, as coals, petroleums, iron ores, clay and building stones.

4. The Hawes, Krantz and Rosenbusch petrographical collections of hand specimens of typical rocks, supplemented by thin sections for microscopic study.

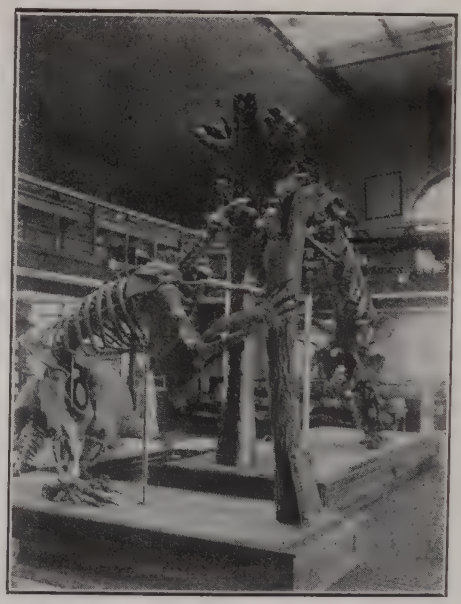
5. The Prosser collection of Paleozoic rocks and fossils from the typical localities of New York and the Appalachians, together with a collection of rocks and fossils from the Carboniferous, Permian and Cretaceous systems of Kansas and Nebraska.

The Museum also contains a relief map of the state, a number of other models and mounted skeletons of a Mastodon and a Megalonyx from Ohio.

2. **General Geology.** Structural, Historical and Dynamical Geology. Three hours lectures and recitations and two hours laboratory and field work. In the laboratory the Ohio Geological Reports and characteristic



GEOLOGICAL MUSEUM, ORTON HALL



GEOLOGICAL MUSEUM, ORTON HALL

fossils will be studied. In the field, sections will be measured, formations identified, specimens collected and the student given an idea of the method of work pursued by a field geologist. First term. (Required in Long Course.)

6. **Economic Geology.** Lectures. Economic materials of stratified rocks, clay, limes, cements, coals, iron ores, phosphates, petroleum, etc. Economic materials derived from veins and igneous rocks, gold, silver, copper, mercury. Gems. Books of reference used by students in preparation of their work: Publications of U. S. Geological Survey. State Geological Surveys, Phillips Ore Mining. Three times a week. Second term. (Required in Long Course.)

GERMAN LANGUAGE

(University Hall, Rooms 32 and 33)

PROFESSOR EGGERS, ASSOCIATE PROFESSOR MESLOH, MISS BARROWS, MR. MOORE.

1. **Elementary.** Four times a week. (Required throughout the first year of Long Course for all students who have not offered it as an entrance requirement.)

2. **Science Reading.** Twice or four times a week. Three terms. (Required in Long Course.)

LATIN

(University Hall, Rooms 29, 28 and 30 and Chemical Hall, Room 13)

PROFESSOR DERBY, ASSOCIATE PROFESSOR HODGMAN, ASSISTANT PROFESSOR ELDEN, ASSISTANT PROFESSOR LANDACRE.

26. **Pharmaceutical.** Five times a week. First second and third terms. The aim of this course is to give the student, in addition to the necessary command of forms and construction, a good knowledge of Latin terms used in pharmacy and medicine, with some facility in reading and writing prescriptions in Latin. (Required in the Short Course; also in the first year of Long Course for all students not presenting Latin as an entrance requirement.)

MATHEMATICS

(University Hall, Rooms 39, 41, 43 and 45)

PROFESSOR BOHANNAN, ASSOCIATE PROFESSOR MCCOARD, ASSISTANT PROFESSOR ARNOLD, ASSISTANT PROFESSOR SWARTZEL, MR. RASOR, MR. TRAVIS.

14. **Plane Trigonometry.** *Loney.* Five times a week. First term.
15. **Analytical Trigonometry.** *Loney.* Twice a week. Second term.
16. **College Algebra.** *Taylor.* Three times a week. Second term.
17. **Plane Analytics.** *Loney.* Five times a week. Third term.

(The above courses are required in the Long Course.)

METALLURGY AND MINERALOGY

(Chemical Hall, Rooms 4 and 3)

PROFESSOR N. W. LORD, MR. SOMERMEIR.

The Department of Metallurgy and Mineralogy occupies the eastern wing of the Chemical Hall and a large portion of the basement.

There is a fully equipped assay laboratory with wind and muffle furnaces of ample capacity and modern design, crushing and sampling apparatus, Ainsworth and Troemer assay balances.

The assay laboratory is in the large basement and one fifty-foot stack connects with the furnaces, of which there are thirteen in all. There are fourteen desks in this laboratory, which is forty by sixty feet, including office and balance room. A small room adjoining serves for the storage of coal and coke for use in the furnaces.

Wet methods of assay and Metallurgical analysis generally, including iron and steel, fuels and gases are taught in the laboratory on the first floor which contains seventeen desks, and is equipped with complete apparatus for technical analysis.

There is a calorimeter room in the basement with a Mahler bomb-calorimeter, oxygen cylinders, electrical connections, etc., for testing of fuels.

A collection of minerals and rocks is provided for illustrating the lectures in mineralogy, and sets of special specimens for the students in determinative mineralogy and blow-pipe work.

The mineralogical lecture room is provided with a projecting lantern and a large number of slides illustrating the treatment of ores and metals.

2. **Mineralogy.** Lectures. Three times a week. Third term. (Required in the Long Course.)

3. **Determinative Mineralogy.** Laboratory course in practical determination of minerals by physical and chemical tests. Each student is furnished with a set of apparatus, and works under an instructor's inspection. Brush's *Determinative Mineralogy* is used as a manual. Five times a week. Third term. Must be preceded by Course 2. (Elective.)

5. **Metallurgical Laboratory.** Lectures and laboratory work. Laboratory practice in the analysis of iron and steel, fuel and slags, and the assays of lead, copper and zinc ores by wet methods, using approved methods as practiced in technical laboratories of metallurgical works. Course 5 must be preceded by General Chemistry, Courses 7 and 12. Five laboratory periods a week. Three terms. (Elective.)

6. **Assaying.** Laboratory work. Practical work in the assaying of gold, silver and lead ores, by furnace methods. Oral instruction, with reference to standard books on assaying. Five laboratory periods a week. Second term. (Elective.)

PHARMACY

(Chemical Hall, Rooms 13 and 12)

PROFESSOR KAUFFMAN, ASSISTANT PROFESSOR LANDACRE, ASSISTANT PROFESSOR DYE.

The Pharmacy Department occupies the west wing, first floor of Chemical Hall.

The apartments consist of a large general laboratory, a smaller laboratory for advanced students, a dispensing room, reading room, lecture room, private laboratory and the office of the Dean.

The main laboratory will accommodate fifty students. Each desk is equipped with a very complete set of apparatus for individual use and special appliances are provided for general use. This laboratory is well provided with hoods, drying closets, steam pans, distilling apparatus, percolating racks, mills and indeed everything necessary to conduct the ordinary operations of Pharmacy.

The laboratory for advanced work is similarly provided except that the individual sets of apparatus vary according to the line of work being followed and the apparatus for general use (as for example the balances) is of the highest degree of accuracy. This laboratory will accommodate about twenty students.

The dispensing room is a completely equipped and well stocked drug store. The prescription desks are large enough to permit several students to work at one time and a full complement of apparatus for the work of the dispensing counter is provided.

The prescription files are very complete and cover as far as possible the entire range of prescription practice.

In the reading room are kept the books of reference belonging to the department and such other books as may be drawn from the general library of the University for use during special investigation. Here also are to be found the pharmaceutical journals.

The lecture room is well supplied with apparatus and appliances for illustration and experiment. About the walls are arranged cases in which are kept sets of specimens illustrating processes of manufacture, specimens of rare, costly and curious drugs, and of official preparations. Here also is a complete set of specimens of official crude drugs arranged by number only for practice in the "recognition of drugs".

The instruction in both courses is practically the same for two years. The work begins with a series of lectures on General Pharmaceutical Processes. These lectures are freely illustrated by experiment and demonstration. At the conclusion of these lectures the laboratory work begins and continues throughout the course, being continuously supplemented by lectures and recitations. The remainder of the first year is devoted to the United States Pharmacopœia official preparations. These

PHARMACEUTICAL LABORATORY

are studied by classes beginning with the more simple and each student is required to produce some two hundred satisfactory preparations.

The first term of the second year is given to the study of the National Formulary unofficial formula, the allotment for laboratory work being fifty preparations.

The remainder of the second year is divided between Prescription Practice and Dispensing and Pharmaceutical Testing. The Department possesses a large number of bona fide prescriptions, and the students are drilled in reading, calculating doses and compounding, and are given daily practice in the preparation of solutions, mixtures, powders, pills, suppositories, tablets, etc.

Much time is also given to the application of the tests for strength and purity of chemicals and pharmaceutical preparations.

This closes the work of the Short Course. Students in the Long Course continue. A considerable part of the third year is given to Pharmaceutical Assaying and the study of the Alkaloids, the rest of the year to the Synthetic preparations. The final year is given to General Pharmacy and Pharmaceutical Chemistry under the heading "Methods of Manufacturers". The laboratory work is conducted with a view to economy in production and the variation in method and manipulation when working in large quantities illustrated.

During laboratory hours the professor and his assistants are at hand for consultation and advice.

The subject of Pharmacognosy, Materia Medica and Therapeutics extends through one year and is taught by lectures and recitations. The history, source, methods of collection and preparation of drugs, the preparations thereof, their uses and effects, poisons and antidotes are all considered. The department possesses a large cabinet from which specimens of the drugs under consideration are taken and their characteristics noted.

An exercise in the ready recognition of drugs is held from time to time.

6. **Pharmacy.** General pharmaceutical processes. Lectures three times a week. First term.

7. **Pharmacy.** United States Pharmacopœia official preparations. Lectures twice a week. Laboratory practice daily. Second term.

8. **Dispensatories.** Official preparations. Lectures twice a week. Laboratory practice daily. Third term. (Courses 6, 7 and 8 are required in both the Long Course and Short Course.)

9. **Pharmaceutical Chemistry.** Unofficial preparations. The National Formulary. Lectures twice a week. Laboratory practice daily. First term.

10. **Extemporaneous Pharmacy.** Prescription practice. Lectures once a week. Laboratory practice three times a week. Second term.

PHARMACEUTICAL LECTURE ROOM

DISPENSING ROOM

11. **General Practice.** Lectures twice a week. Dispensing practice daily. Prescription practice daily. Third term. (Courses 9, 10 and 11 are required in both the Long Course and Short Course.)

12. **Materia Medica.** Official drugs and classification. Three times a week. First term.

13. **Materia Medica.** Official and unofficial drugs. Three times a week. Second term.

14. **Materia Medica and Therapeutics.** Synthetic Products. Poisons and Antidotes. Three times a week. Third term. (Courses 12, 13 and 14 are required in the Long Course.)

15. **Pharmaceutical Assaying.** Five times a week. First term.

16. **Methods of Manufacture.** Five times a week. Second term.

17. **General Pharmacy.** Two lectures, three laboratory periods a week. Third term. (Courses 15, 16 and 17 are required in the Long Course.)

PHYSICS

(University Hall, Rooms 10, 14, 23 and 24.)

PROFESSOR THOMAS, ASSISTANT PROFESSOR BOYD, MR. KESTER
MR. BROOKS.

The Department of Physics occupies the west half of the first two floors and basement of University Hall. The first floor rooms are the principal lecture room, fifty-five by thirty-eight feet; the elementary lecture room; an instrument room; and the office of the Department.

On the second floor are rooms for elementary laboratory work, and a dark room for photographic work, in connection with spectrum and Roentgen-ray apparatus. The lecture room on the first floor is also used in laboratory work. In the basement, provision is made for advanced exercises in electricity, heat, etc.

The Department has an excellent equipment of apparatus, to which additions are constantly being made. The apparatus includes a large collection of pieces for illustration of the general lecture room work, but is principally chosen for accurate measurement in the laboratory. A set of standards of length, capacity and mass, sent under the act of Congress supplying such sets to the several agricultural colleges, is in the possession of the Department. The pieces are copies of the United States standards made by the Coast Survey at Washington.

Among the principal pieces of apparatus are a dividing machine by Fauth & Co.; chronometers by Parkinson & Frodsham and by Negus, the latter a break-circuit; a chronograph by Fauth & Co.; a Hipp's chronoscope; cathetometers by Salleron and by the Geneva Society, the latter an exceptionally fine instrument; Regnault's apparatus for vapor tension, for expansion of gases and for specific heat; Melloni-Tyndall apparatus for radiant heat; standard thermometers by Baudin and others; Rutherford

and Rowland diffraction gratings; Rowland's spectrum photographs, spectroscopes by Brashear, Browning, Apps and others; Salleron's complete apparatus for projections in polarized light lanterns for projections by the lime light and the arc light; a variety of sound apparatus from Koenig; portable and quadrant electrometers; Kelvin galvanometers of high and low resistance; Weidman, Kohlrausch and other galvanometers; standard resistance coils, with Cavendish laboratory certificate; several sets of resistance coils and bridges; a Kew magnotometer; Kelvin standard balances; Weston ammeters and voltmeters; standards of self-induction standard battery cells; photometric standards and photometers; X-ray apparatus, etc.

Under the laws of Ohio, the professor of Physics is ex-officio State Sealer of Weights and Measures, and all of the standard weights, measures and balances received from the United States government are in the rooms of the Department.

1. **Physics.** Five times a week. Lectures and recitations. Carhart and Chute's Elements of Physics. First and second terms. (Required in the Short Course.)

11. **Physics.** Three times a week. Three terms. (Required in the Long Course.)

In this course one hour a week is given to lecture or text-book work. On each of the other two days the class meets for two hours' continuous work in the laboratory. At the opening of each day's work the instructor discusses the experiment to be performed, covering the theory and manipulation. The class then performs the experiment, each member being provided with the complete apparatus necessary. When the measurements are completed, the results are tabulated, compared, discussed, curves drawn, and notes written.

The purpose of this course is to make the student familiar with the general principles of physical manipulation and interpretation; with the methods used in certain physical measurements considered important either theoretically or practically; and to give the student a better comprehension of subjects discussed in the class room. In the choice of experiments to be performed, due consideration is given to their practical bearing upon the work of a pharmacist.

RHETORIC AND ENGLISH LANGUAGE

(University Hall, Rooms 38, 40, 42, 55)

PROFESSOR DENNEY, ASSISTANT PROFESSORS GRAVES, MCKNIGHT, ALLEN, MR. BOHN, MR. ABBOTT.

1. **Paragraph Writing and Analysis of Prose.** Twice a week. Three terms.

21. **Essentials of Oral Discourse.** Once a week. Three terms.

Courses 1 and 21 are required in the Long Course.

GENERAL INFORMATION

QUIZ CLASS

This class, composed of advanced students in Pharmacy and those who have had experience in drug stores, meets two hours every week, at periods suitable to the majority of the class.

The work is optional and consists of quizzes on Pharmacy, Chemistry, Botany, Materia Medica, Therapeutics, Toxicology and all branches which are of interest to the student preparing for the State Board examination. A text-book is used as a guide and part of the hour is devoted to work which has been outlined and the remainder of the time to general questions. Specimens of botanical drugs and chemicals are at hand and are used for purposes of identification and study.

THE EXPERIENCE REQUIREMENT

The Ohio Board of Pharmacy requires as a condition of registration as Pharmacist four years of practical experience and for registration as Assistant Pharmacist two years of practical experience. The time spent in this college is accepted in full as applying on this requirement.

OHIO STATE UNIVERSITY PHARMACEUTICAL ASSOCIATION

This is an organization which meets once a week for the purpose of discussing subjects of special interest to pharmacists.

The membership is composed principally of students in the College of Pharmacy.

The exercises consist of a major and minor paper, reading and quiz. After the regular exercises are concluded a short intermission is taken, after which the business meeting is held. At the business sessions the students get some practice in parliamentary rules and the discussions prove very beneficial.

About once a month the regular exercises are dispensed with and some prominent Pharmacist of the city or state is invited to address the Association on the practical side of the drug business. The organization is not without its social feature, a special meeting being held for this purpose at the end of each term.

THE CHEMICAL ASSOCIATION

This Association, composed of the students and instructors in the Departments of Chemistry and Pharmacy, has for its object the discussion of such subjects as are of importance to students of Chemistry, special stress being placed on recent discoveries. The meetings are held semi-monthly and are of great interest. Both professors and students contribute to each program.

ADMISSION TO ADVANCE STANDING

1. Applicants who do not come from some other University or College must first obtain admission in the manner already described. They will then be examined on the undergraduate studies for which they ask credits.

2. Applicants who come from the collegiate department of an approved College, and who bring explicit and official certificates describing their course of study and scholarship, and also certificates of honorable dismissal, will be admitted without examination, except such as may be necessary to determine what credit they are to receive here for work done in the College from which they come.

EXAMINATIONS AND STANDING

Rule 111. Students shall be regarded as strictly on probation until they have removed all deficiencies and conditions in entrance requirements.

Rule 112. Students who have any entrance conditions outstanding at the beginning of the third year of residence at the University will not be allowed to join their classes until such conditions have been removed.

Rule 116. The standing of students in each study shall be reported at the end of each term, as "merit", "passed", "conditioned", or "failed". This standing shall be determined by the head of each department by such means and methods as he may choose, but no student shall be reported "failed" without having had the opportunity of a written examination.

Rule 117. The standings "merit" and "passed" indicate that the student has full credit for the term's work in the study in which this standing is obtained.

Rule 118. The report "credit" (K) shall be used only for work done in regular class at the University.

Rule 119. The standing "conditioned" indicates that credit for the term's work in the study in which the condition was incurred is withheld. In the following term the student shall be given an opportunity to obtain credit by a special re-examination; or, if the study be a continuous one, the instructor in charge may, at his discretion, excuse the student from re-examination, and may allow him to obtain credit by pursuing the study successfully during the following term. If the student thus excused from

re-examination does not pass upon the work of the second term, he shall be reported as "failed" in the work of both terms. Any condition that is not removed within one year from the beginning of the term in which it was incurred shall lapse into a "failure".

Rule 120. The standing "failed" indicates that the student has obtained no credit whatever for the term's work in which the mark is given. The student must, at the first opportunity, repeat in class the study in which he has failed. But a student who has failed in an elective study may be excused from repeating such study by the Executive Committee of his college. In case of failure in any continuous study, the work of the term in which the failure is incurred must be repeated in class before any subsequent term's work in that study can be commenced. Unexcused absence from any regular examination is construed as a failure therein.

Rule 121. Any student who fails at the end of any term to secure full credit for two-thirds of his work shall be put on probation for the following term with restricted work, and, if similarly delinquent in his studies at any time within the next ten academic months, shall thereby cease to be a member of the University.

GRADUATION

Rule 99. No one will be admitted to candidacy for a degree at any Commencement who has not done the last year of work required for the degree, in residence at this University, and no student will be registered in such candidacy later than the first day of October.

Rule 128. Except by unanimous consent of the Faculty, no candidate for graduation will be recommended for a degree whose record is not in all respects complete by the Friday evening previous to the Commencement Day at which he seeks the degree.

Rule 137. No candidate for graduation will be permitted to register for the second term of his graduating year except upon presentation to the Bursar, of the President's certificate that his thesis subject has been announced and approved.

AMOUNT OF WORK

No student is permitted to take less work than fifteen credit hours a week, except by special permission, and no student will be permitted to take more than the regular work of the class to which he belongs, who has not passed all his work for the preceding term. A credit hour means one hour class room work in lecture, recitation or quiz, or two hours of laboratory work.

RIGHTS AND PRIVILEGES

Students of the College of Pharmacy are entitled to all the advantages of the Libraries, Museums, and the Gymnasium and are eligible to membership in the Literary, Scientific, Athletic, Fraternal, Musical and other societies.

THE CONVOCATION

At the opening of the year in September 1900, the daily chapel exercises were abandoned. As a substitute for the short daily exercise an entire hour is now devoted to a convocation at which the president presides. In addition to devotional exercises an address is delivered upon some suitable topic. During this hour the libraries and laboratories are closed and no other University exercises occur. It is expected that the Faculty and students will attend. The hour is definitely fixed at ten o'clock on Wednesday of each week. The public is always welcome at the Convocation.

AIDS TO MORAL AND RELIGIOUS CULTURE

One of the most commendable organizations in the University is a branch of the International Young Men's Christian Association, organized in 1883. This association is directly affiliated with the work for young men directed by the college department of the State Y. M. C. A. work. Services are held weekly and voluntary classes for Bible study are successfully organized. The local association has a secretary who devotes his entire time to work among the young men. The management has rented a house at 71 West Eleventh Avenue as a headquarters for the Association. It is hoped that in the near future a permanent home for the Association may be provided.

An equally commendable organization is the Y. W. C. A. affiliated with the State organization. Religious meetings are held regularly at noon on Tuesdays. Occasionally meetings for social purposes are held as provided for by the organization. Both of these organizations are worthy of public consideration.

New students are invited to write to the address below for a hand-book of information concerning the University or for information concerning rooms, boarding or employment. Address, J. P. Davies, 71 West Eleventh Avenue, Columbus.

CADET SERVICE AND GYMNASIUM

From the opening of the year until the Thanksgiving recess cadet service is required four times a week; from Thanksgiving until the Spring recess cadet service is required twice each week and gymnasium practice twice; from the Spring recess until the first of June cadet service is required four times each week.

The gymnasium is free to all students, but those desiring a locker will be charged a fee of one dollar a term.

PHYSICAL EDUCATION

The Gymnasium is a large modern building, completed in 1898. The basement is used for lockers, dressing rooms and baths. The east end is used by the young women, the west end by the young men. Each end has separate shower and plunge baths.

The exercising floor, 80x150 feet, is thoroughly equipped with the best apparatus in duplicate. The running track is fourteen laps to the mile, with graded elevations at the curves to meet the requirements of the different rates of speed. The track is laid with felt an inch in thickness, three and a half feet wide and covered with rubber coated canvass.

The work is compulsory for the first and second year students. The course consists of theoretical and practical work in the gymnasium, and includes calisthenics, light and heavy gymnastics, physiology of exercise, physical examinations and measurements. It is intended to give the student such a training in the methods of Physical Education that he may have a comprehensive knowledge of the subject.

A thorough physical examination of each student is made at the opening of the year, and the measurements are outlined on charts, so as to show the parts below the normal development, for which special exercises suited to the health and physical condition of each individual will be suggested. These charts are constructed from the accumulated data of several thousand measurements of college students. Experience demonstrates that the body, as well as the mind, is susceptible of right and wrong development. Every part of the body can be strengthened and increased and the relation of one part to another can also be changed so as to correct imperfections.

Class leaders who act as floor aids are selected from among those who show a proficiency in the work, these students are given a certificate of their appointment as Aids, and the letter A, in scarlet which they are entitled to wear on their gymnasium suits.

It is the aim of the department to secure health, vigor and such harmonious development of the body as will fit it to resist disease and prepare it for efficient service, both now and later in life.

FEES

Incidental Fee.—A charge of eighteen dollars a year is made against all students, under the head of incidental expense. In the case of former students if this fee is not paid until the second day of the term one dollar will be added, and for each succeeding day of delinquency fifty cents will be added.

Laboratory Fees.—Students in the laboratories are required to pay fees to cover, in part, the cost of the material consumed, and the deterioration of the expensive instruments used by them. The fees charged per term in the laboratories mentioned below are as follows:

Botany, 3, 4	$2.00
Pharmacy, 7, 8, 9, 10, 11, 15, 17, 18	1.50

In the laboratories of the Department of Chemistry, Agricultural Chemistry and Metallurgy, each student is required at the beginning of each term to pay a fixed charge of one dollar and fifty cents for gas and water. He is also required to buy his own supplies, which may be obtained at the store-room in Chemical Hall. With reasonable care, this expense need not exceed $5.00 per term.

All term dues must be paid at the opening of each term as a condition of admission to classes.

A fee of five dollars to cover expenses of graduation, diplomas, etc., is required of each person receiving one of the ordinary degrees from the University, and this fee must be paid before the degree is conferred.

OTHER EXPENSES

There are two dormitories on the University grounds for the use of students. Each occupant is charged by the University a rent of one dollar and fifty cents a term.

The South Dormitory affords unfurnished rooms to such students as desire to board themselves, and thus to reduce their expenses to a minimum. The expense of living in this way falls below two dollars per week. Applications for rooms should be made to the President of the University.

The North Dormitory will accommodate more than sixty students. Board, furnished rooms, fuel, light and washing are, at present prices, supplied for about three dollars and twenty-five cents a week. Students will be admitted on special recommendation to the President of the University.

Boarding clubs are also formed in the neighborhood of the University. Furnished rooms are rented at seventy-five cents to one dollar a week for each student, and the cost of board is two dollars to three dollars a week.

Board, with furnished rooms, can be obtained in private families, within convenient distances of the University, at rates varying from four dollars to five dollars a week. The ruling rate may be taken as four dollars.

The uniform with which the members of the battalion are required to provide themselves costs about fourteen dollars. It is quiet in pattern, and is designed to be worn daily in place of civilian dress.

The expenses of a student in this College for a year may be estimated as follows, excluding clothing (except uniform) and traveling expenses:

	Low.	Average.	High.
Incidental fees	$18 00	$18 00	$18 00
Laboratory fees	15 00	25 00	54 00
Books and stationery	15 00	25 00	40 00
Room	4 50	37 00	75 00
Furniture	10 00	....	.....
Board	70 00	110 00	150 00
Uniform	14 00	14 00	14 00
	$146 50	$229 00	$351 00

The second and third estimates for room include light, fuel and care. The third estimate is for a room occupied by a single student. The requirements for laboratory fees and books depend upon the course of study pursued.

SELF-SUPPORT

There is a large amount of work upon the University farm which is assigned to students. *But the University cannot promise work to all applicants.* Many students find work in private families, in offices, and in various occupations, by means of which they defray at least a portion of their expenses. A person of ability and energy, who is master of a trade, or who can do good work of any kind, can generally find remunerative employment. It has seldom been known that any student of ordinary energy and industry was obliged to leave the University because of a lack of money for necessary expenses, *after having been say sixty days on the ground*—or long enough to inform himself as to the opportunities for securing employment. Students should distinctly understand that where they attempt entire or partial self support they should lengthen the term of study. An employment bureau is maintained at the University where the names of those seeking work and of those desiring workers are recorded. Students should report to the Executive Office from time to time as to their needs and their work. This will enable the authorities to be more helpful than otherwise would be possible.

For information concerning text-books, etc., address

F. R. WEST,
Ohio State University,
Columbus.

A WINTER SCENE ON THE CAMPUS

REGISTER OF ALUMNI

Albert, Louisa Mary, '96, G. Ph.....Columbus, Ohio.
Mrs. A. E. Vinson.
Allaman, William Ernest, '96, G. Ph.....Columbus, O.
Student Ohio Medical University.
Armstrong, William H., '90, G. Ph.....Marysville, O.
Pharmacist.
Bagley, Anna Gertrude, '94, G. Ph.....Columbus, O.
With Hallwood Cash Register Co.
Barrick, Fred Ashberry, '98. Ph. C.....Columbus, O.
with A. W. Kiler, Pharmacist
Baughman, George Washington, '97, G. Ph.....Springfield, O.
Pharmacist.
Blair, Edward G. '95, G. Ph. .....Shawnee, O.
Pharmacist.
Boesche, Felix John, '96, G. Ph.....Denver, Colorado.
Bowen, Charles Flood, '00, Ph. C.....Columbus, Ohio.
Student Starling Medical College.
Bradford Ernest, '92, G. Ph.....Columbus, O.
Chemist with N. W. Lord, O. S. U.
Bradshaw, Harry James, '99, Ph. C.....Columbus, O.
King Avenue Pharmacy.
Braun, Joseph George, '97, G. Ph. .....Columbus, O.
Pharmacist.
Brewer, John Whitney, '96, G. Ph.....Columbus, O.
With G. H. Matson, Pharmacist.
Bunnell, Larone Allen, '98, G. Ph. .....Dayton, O.
Pharmacist.
Calkins, William Bartlett, '98, G. Ph. .....New Straitsville, O.
Chemist, Steel Works.
Canfield, Delos Wilford, '00, Ph. C.....Chardon,
Pharmacist.
Cromley, Alva Miller, '97, G. Ph.....Circleville, O.
Culbertson, Claude Lanier, '98, Ph. C. .....Zanesville, O.
With Nye Bros., Druggists.
Cummins, Henry Rollin, '91, G. Ph.....Cleveland, O.
Pharmacist Lake View Hospital.
Day, Clayton Miller, '99, Ph. C. ....Blanchester, O.
Pharmacist.

Dye, Clair Albert, '91, G. Ph. ..... Berne, Switzerland.
Student at University.
Easterday, Charles Todd, '91, G. Ph. ..... Wellston, O.
With Harrison & McGhee.
Fischer, Robert, '95, G.Ph., '96, M.Ph., '98, B.Sc., ... Ithaca, N. Y.
Laboratory Assistant Cornell University.
Funk, Roy W., '99, Ph. C. ..... Columbus, O.
Assistant, Chemical Store Room, and Student O. S. U.
Gardner, Charles Alfred, '00, Ph. C. ..... Cincinnati, O.
Tompkins' Pharmacy.
Goodman, Sylvester Jacob, '96, G. Ph. ..... Philadelphia Pa.
Student of Medicine, W. & J. Medical College.
Grandle, Frank Albert, '91, G. Ph. ..... Centerburg, O.
Pharmacist.
Graner, Carl, '98, G. Ph. ..... Philippine Islands.
Hospital Steward, U. S. A.
Green, Robert Lee, '92, G. Ph. ..... Somerset, O.
Groff, Orsylla A., '94, G. Ph. ..... Columbus, O.
Pharmacist.
Hancock, David Ransom, '89, G. Ph. ..... Columbus, O.
Physician.
Haney, Thomas Carlyle, '94, G. Ph. ..... Columbus, O.
Pharmacist.
Harrold, Ernest Ellwood, '95, G. Ph. ..... Columbus, O.
Dispenser, Chemical Store Room, O. S. U.
Harvey, Sherman Lee, '96, G. Ph. ..... Columbus, O.
Druggist.
Harvey, Lucy Monola, '00, Ph. C. ..... Pomeroy, O.
Pharmacist.
Heath, Arthur T., '87, G. Ph. ..... Ashtabula, O.
Analytical Chemist, Consulting Engineer and
Constructor.
Holloway, David Frank, '99, Ph. C. ..... Columbus, O.
Pharmacist, State Hospital.
Huddleson, Don Carlos, '97, G. Ph. ..... Columbus, O.
Instructor in Gymnasium, O. S. U., Student
Starling Med. Col.
Huff, George Harry, '99, Ph. C. ..... Columbus, O.
With the Kauffman-Lattimer Co.
Johnson, William Noel, '99, Ph. C. ..... Piqua, O.
Pharmacist.
Jones, Daniel David, '93 ..... Gallipolis, O.
Pharmacist Ohio Epileptic Hospital.
Kathe, J. Bernard, '99, Ph. C. ..... Springfield, O.
Pharmacist.

Kerr, Franklin Pierce, Jr., '99, Ph. C. ..... Columbus, O.
Pharmacist.

Keiser, Romeo Orpheus, '92, B. Sc., '96, G. Ph., '98, M. D., O. M. U., '99, M. D. Cleveland Homeopathic Medical College ..... Columbus, O.
Physician.

Kiler, Abdil, William, '96, G. Ph. ..... Columbus, O.
Pharmacist.

Kimberly, Charles Hubbell, '00, B. Sc. ..... Columbus, O.
Fellow and Laboratory Assistant in Chemistry O. S. U.

Krieger, Charles Henry ..... Columbus, O.
With the Kauffman-Lattimer Co., Wholesale Druggists.

Lallance, Leroy Armstrong, Jr., '99, Ph. C. ..... Wheeling, W. Va.
Pharmacist.

Landacre, Walter Alexander, '91, G. Ph. ..... Columbus, O.
Assistant Professor Pharmacy, O. S. U.

Lawrence, Arthur Kelton, '97, G. Ph. ..... Columbus. O.
Pharmacist.

Lee, Edwin Sherman, '93, G. Ph. ..... Columbus, O.
Pharmacist.

Leffler, Edward Victor, '96, G. Ph. ..... Leipsic, O.

Logsdon, Clement Joy, '98, G. Ph. ..... Dayton, O.
Pharmacist. With J. C. Miller.

Macguire, Charles White, '95, G. Ph., '97, M. D., Toledo Medical College ..... Toledo, O.
Physician.

Magley, Robert O., '97, G. Ph. ..... Columbus, O.
With Miller, Wagoner, Fiesner & Co.

Mason, George Francis, '90, G. Ph. ..... Milwaukee. Wis.
Student of Medicine, Milwaukee Med. College.

Matson, George Hiram, '92, G. Ph. ..... Columbus, O.
Druggist and Professor of Pharmacy and Materia Medica, O. M. U.

Mebs, George Henry, '97, G. Ph. ..... Columbus, O.
Pharmacist Columbus State Hospital.

Metzger, Edward Henry, '97, G. Ph. ..... Columbus, O.
Assistant Pharmacist State Epileptic Hospital.

Middleton, Ambrose, '95, G. Ph. ..... Malta, O.
Pharmacist.

Miller, Daniel Elmer, '90, G. Ph. ..... Dayton, O.
Pharmacist.

Moore, Rodney Downing, '98, Ph. C. ..... Youngstown, O.
Pharmacist.

Morris, Harry, '98, Ph. C..... Columbus, O.
Student O. S. U.

Moss, William, '98, G. Ph. ....Cambridge, O.
Pharmacist.

Naddy, Charles Joseph, '99, Ph. C..... ..... Columbus, O.
City Hall Drug Store.

Odebrecht, August, '95, G. Ph. .....Columbus, O.
Chemist. With H. Braun & Sons Co., Wholesale Druggists.

Obetz, Francis H., '98, G. Ph., '99, M. D., Starling
Medical College..... ....Columbus, O.
Physician.

Oglesby, Nicholas Perkins, '00, Ph. C.....Columbus, O.
Assistant in Chemical Store Room, O. S. U.

Pearce, George Downer, '92, G. Ph..... ... ...S. Charleston, O.
Pharmacist.

Potter, Lewis Hall, '99, Ph. C.....Columbus, O.
With Orr, Brown & Price, Wholesale Druggists.

Reese, William Henry, '96, G. Ph..... ... . Glenroy, O.
Pharmacist.

Rostofer, Freeman Allen, '99, Ph. C..... .....Columbus, O.
Columbus Pharmacal Co.

Shilling, Robert William, '98, Ph. C..... .....Columbus, O.
Student of Medicine, O. M. U.

Slater, Burr Homer, '95, G. Ph..... .. Chesterville, O.
Pharmacist.

Smith, Burton Griffin, '95, G. Ph. ... .Columbus, O.
Chemist with Columbus Pharmacal Co.

Smith, Clarence Elmer, '98, G. Ph.....Columbus, O.
Student at O. M. U.

Smith, Edward E., '97, G. Ph..... . .....Indian Territory.

Somermeir, Edward Everett, '98, G. Ph. ... ..Columbus, O.
Assistant in Mining and Metallurgy, O. S. U.

Southard, Eustace, Elden, '95, G. Ph. ....Columbus, O.

Spencer, William Henry, '91, G. Ph.....Sandusky, O.
With the firm of Strong & Spencer.

Stanberry, Charles L., '92, G. Ph.....McConnellsville, O.
Pharmacist.

Stump, William Lisle, '97, G. Ph., '98, Ph. M.....Columbus, O.
Pharmacist.

Sutphen, James Leonard, '97, G. Ph..... Columbus, O.
Pharmacist.

Sweet, Fred Watson, '98. Ph. C..... .....Columbus, O.
With Gault, Pharmacist.

Swisher, William Henry, '96, G. Ph. ....Eaton, O.
Physician.

Teter, Anstie Welch, '96, G. Ph. .....Bainbridge, O.
Pharmacist.
Tupper, Eugene Larry, '93, G. Ph.....Ottawa, O.
Physician.
Voke, Lewis Farwell, '93, G. Ph., M. D., Starling
Medical College.....Columbus, O.
Physician.
Wagstaff, Edward A., '93, G. Ph. ..... Niles, O.
Pharmacist, Jones & Wagstaff.
Wagstaff, Harry Garfield, '00, Ph. C. .....Columbus, O.
Student O. S. U.
Weidner, George F., '87, G. Ph..... .....Columbus, O.
Chemist for the Kauffman-Lattimer Co.
Wendt, William Carl, '89, G. Ph.....Columbus, O.
Manager of Heer's Pharmacy.
Whitford, Eula Agler, '95, G. Ph. .....Columbus, O.
Columbus Pharmacal Co.
Young, Harry Nelson, '95, G. Ph. ....Flint, Mich.
Pharmacist.

CENTRAL BED IN SEC. 1, BOTANICAL GREENHOUSE

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University Bulletin Series 5 Number 14

OHIO STATE UNIVERSITY

CATALOGUE OF THE

COLLEGE OF VETERINARY MEDICINE

1901-1902

COLUMBUS
PUBLISHED BY THE UNIVERSITY

Entered at the Postofftce, Columbus, Ohio, as second-class matter

OHIO STATE UNIVERSITY

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BOARD OF TRUSTEES.

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J. McLAIN SMITH	Dayton	" 1904.
PAUL JONES	Columbus	" 1905.
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FACULTY AND COURSES OF STUDY

THOMAS J. GODFREY	JOHN T. MACK	O. T. CORSON

DAYS AND DATES.

1901.

Entrance Examinations (8 A. M.)	Monday,	September 16.
Registration	Tuesday,	September 17.
Lectures and Class-work Begin	Wednesday,	September 18.
Meeting of Trustees	Wednesday,	September 25.
Thanksgiving Recess	Thursday,	November 28.
	Friday,	November 29.
First Term Ends	Wednesday,	December 18.

Christmas Vacation.

1902.

Second Term Begins	Thursday,	January 2.
University Day	Saturday,	February 22.
Second Term Ends	Friday,	April 4.

Spring Recess.

Third Term Begins	Wednesday,	April 9.
Meeting of Trustees	Wednesday,	April 9.
Field Day—Athletic Association	Saturday,	May 17.
Memorial Day	Friday,	May 30.
Final Examinations	Monday to	June 9.
	Friday,	June 13.
Baccalaureate Sermon	Sunday,	June 15.
Entrance Examinations (8 A. M.)	Monday,	June 16.
	Tuesday,	June 17.
Class Day	Monday,	June 16.
Meeting of Trustees	Tuesday,	June 17.
Alumni Day	Tuesday,	June 17.
COMMENCEMENT	Wednesday,	June 18.

Summer Vacation.

Entrance Examinations (8 A. M.)	Monday,	September 22.
Registration	Tuesday,	September 23.
Lectures and Class-work Begin	Wednesday,	September 24.
Annual Address by the President (11 A. M.)	Friday,	September 26.

SNAP SHOTS FROM THE CLINIC

FACULTY AND INSTRUCTORS

REV. WILLIAM OXLEY THOMPSON, D. D.....University Grounds
President of the University.

DAVID STUART WHITE, D. V. M., Dean.....West Fifth Avenue
Surgery and Horse Shoeing.

HENRY ADAM WEBER, PH. D.....1342 Forsythe Avenue
Chemistry.

ALBERT MARTIN BLEILE, M. D.....218 King Avenue
Physiology, Histology and Physiological Chemistry.

WILLIAM ASHBROOK KELLERMAN, B. Sc., PH. D.....175 Eleventh Avenue
Botany.

THOMAS FORSYTH HUNT, M. Sc.....188 West Tenth Avenue
Zootechny.

GEORGE BEECHER KAUFFMAN, B. Sc.....University Grounds
Pharmacy.

HERBERT OSBORNE, M. Sc.....West King Avenue
Helminthology.

PAUL FISCHER, B. Sc., D. V. M.....Franklin Avenue
Theory and Practice, Meat Inspection, Pathological Anatomy.

SEPTIMUS SISSON, B. Sc., V. S.....University Grounds
Anatomy and Obstetrics.

OSCAR V. BRUMLEY, V. S.....University Grounds
Materia Medica and Canine Practice.

CHARLES BRADFIELD MORREY, B. A., M. D.....King Avenue
Bacteriology and Physiology.

ALBERT EARL VINSON.....134 West Ninth Avenue
Chemistry.

JOHN WRIGHT DECKER, B. AGR.....239 West Eighth Avenue
Milk Inspection.

JAS. W. BURNS, U. S. A., MAJOR.....Columbus Club
Military Science and Tactics.

OLIVE BRANCH JONES.....53 Eleventh Avenue
Librarian.

CLARENCE P. LINHART, M. D.....Great Southern Hotel
Director of the Gymnasium.

VETERINARY HOSPITAL, O. S. U.

CLINICAL STAFF

DR. D. S. WHITE — DR. PAUL FISCHER
DR. S. SISSON — DR. O. V. BRUMLEY

W. SEVERN, CLERK

THE UNIVERSITY.

T should be noted that the Ohio State University is divided into six colleges as follows :

The College of Agriculture and Domestic Science.
The College of Arts, Philosophy and Science.
The College of Engineering.
The College of Law.
The College of Pharmacy.
The College of Veterinary Medicine.

The College of Veterinary Medicine consists of those departments represented in the course leading to the degree of Doctor of Veterinary Medicine, and to a certificate of Veterinary Surgeon.

The College of Agriculture and Domestic Science consists of those departments represented in the courses leading to the degrees of Bachelor of Science in Agriculture, Bachelor of Science in Horticulture and Forestry and Bachelor of Science in Domestic Science ; in the Short Course in Agriculture, in the Short Course in Domestic Science, and in the Course in Dairying.

The College of Arts, Philosophy and Science consists of those departments represented in the courses leading to the degrees of Bachelor of Arts, Bachelor of Philosophy, and Bachelor of Science; and in the Courses Preparatory to Law and to Journalism, and to Medicine.

The College of Engineering consists of those departments represented in the courses leading to the degrees of Civil Engineer, Engineer of Mines, Engineer of Mines in Ceramics, Mechanical Engineer, Mechanical Engineer in Electrical Engineering, Bachelor of Science in Industrial Arts, and Bachelor of Science in Chemistry or in Metallurgy ; in the Course of Architecture, in the Short Course in Clay-working and Ceramics, and in the Short Course in Mining.

The College of Law consists of those departments represented in the course leading to the degree of Bachelor of Laws.

The College of Pharmacy consists of those departments represented in the courses leading to the degree of Bachelor of Science in Pharmacy, and in the Short Course in Pharmacy.

Each College is under the direction of its own Faculty, which has power to act in all matters pertaining to the work of students in that College.

HISTORY.

The land grant made by the United States under an act approved by President Lincoln, July 2nd, 1862, provided that there should be granted to each state an amount of public land equal to thirty thousand acres for each Senator and Representative to which the State was entitled by the apportionment of the census of 1860. The proceeds under this act were to constitute a perpetual fund the capital of which was to remain forever undiminished and the interest of the same was to be inviolably applied by each State which should take and claim the benefits of the act of the endowment, support and maintenance of at least one "College where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such a manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Governor Tod, in November, 1862, brought the subject before the State Board of Agriculture and later to the attention of the Legislature. In January, 1864, Hon. Columbus Delano introduced a bill accepting the grant. This became a law February 9th, 1864, and pledged the faith of the State to the performance of all the conditions and provisions contained therein. In 1866, an act introduced by Hon. J. T. Brooks, was passed which provided for the establishment of the Ohio Agricultural and Mechanical College, but the provisions were not carried into effect, and a second act introduced by Hon. R. P. Cannon was passed in 1870 entitled "An act to establish and maintain an Agricultural and Mechanical College in Ohio." Under the provisions of this act the institution was located in Columbus and the Board proceeded to the organization of the College and the election of a Faculty of instruction and the institution was opened for the reception of students on the seventeenth day of September, 1873.

In 1878, the legislature passed "An act to reorganize and change the name of the Ohio Agricultural and Mechanical College and to repeal certain acts therein mentioned." The act provided that the Institution should be thereafter designated as "The Ohio State University." Up to this time but one appropriation had been made by the State for the support of the institution. With the reorganization came the larger and broader view of the State's relation to public education, and since that time the Ohio State University has shared with other public educational institutions a more generous support by the State.

The governing body of the institution is a Board of Trustees, appointed by the Governor of the State and confirmed by the Senate, for terms of seven years as provided in the law organizing the University. The original endowment has been supplemented, and the objects of the University promoted, by a permanent annual grant from the United States, under an act of 1890, by special appropriations of the General Assembly; and in 1891,

by a permanent annual grant from the State which grant was doubled by the Legislature of 1896. In accordance with the spirit of the law under which it is organized, the University aims to furnish ample facilities for education in the liberal and industrial arts, the sciences and the languages, and for thorough technical and professional study of agriculture, engineering in its various departments, veterinary medicine, pharmacy and law. Through the aid which has been received from the United States and from the State it is enabled to offer its privileges, with a slight charge for incidental expenses, to all persons of either sex who are qualified for admission.

LOCATION OF THE UNIVERSITY.

The University is situated within the corporate limits of the City of Columbus, two miles north of the Union Depot and about three miles from the State Capitol. The University grounds consist of three hundred and forty-five acres, bounded east and west by High Street and the Olentangy River, respectively. The western portion, about 235 acres, is devoted to agricultural and horticultural purposes, and is under the management of the College of Agriculture and Domestic Science. The eastern portion is occupied by the principal University buildings, campus, athletic and drill grounds, a park-like meadow, and a few acres of primitive forest.

The grounds are laid out with care, ornamented with trees, shrubs and flower beds; and are so managed as to illustrate the instruction in Botany, Horticulture, Forestry, Landscape Gardening and Floriculture.

The University may be reached by either the North High Street or the Neil Avenue electric cars. Those wishing to go to the principal buildings of the University, to the residences on the grounds, or the Athletic field, should take a High Street car going north. Those wishing to visit the Emerson McMillin Observatory, the Veterinary Hospital, Townshend Hall, Horticultural Hall and the Dormitories, will find the Neil Avenue cars more convenient.

The University has thirteen buildings devoted to instruction, one Boiler House, one Power House, two dormitories, six residences and some farm buildings. These buildings represent an investment for construction of about eight hundred thousand dollars. The equipment and apparatus amount to one hundred and seventy thousand dollars. The land now occupied as a site with the farm is valued at one million five hundred thousand dollars.

The buildings of special interest to the College of Agriculture and Domestic Science are Townshend Hall, Horticultural Hall, Veterinary Hospital, Hayes Hall, Botanical Hall, Biological Hall, Orton Hall (Geological building; contains also the Library), and the Armory and Gymnasium.

The University now has over one hundred instructors and thirty-eight departments of study, offers thirty distinct courses, all but one of which require two or more years for completion. Six of these courses are offered by the College of Agriculture and Domestic Science and are described in this announcement.

THE COLLEGE OF VETERINARY MEDICINE

This college provides a thorough education in all that relates to Veterinary Medicine. The purpose of the college is to train its students not only for routine practice, but also to make them capable of filling positions in the field of original research along lines where special scientific veterinary knowledge is required.

Being an institution endowed by the State and Nation, the college does not depend upon fees collected from the students for its support. It can, therefore, demand of its students a high grade of scholarship, and be more directly concerned as to results rather than large numbers.

Veterinary students may avail themselves of the advantages offered by any of the other six colleges of the University, if time permits them to do so. The University library of about 31,000 volumes and 10,000 pamphlets, the gymnasium, literary and musical societies, etc., are as much for the use of veterinary students as for the students of any other college of the University.

The location of the College in a city of about 140,000 inhabitants makes possible a combination of theoretical and practical training in the study of animal diseases. From the city are brought to the clinics mostly horses, dogs and other pet animals, while from the environing agricultural and dairy country come the meat and wool producing animals for treatment. In larger cities these latter animals are are not so readily available for clinical study.

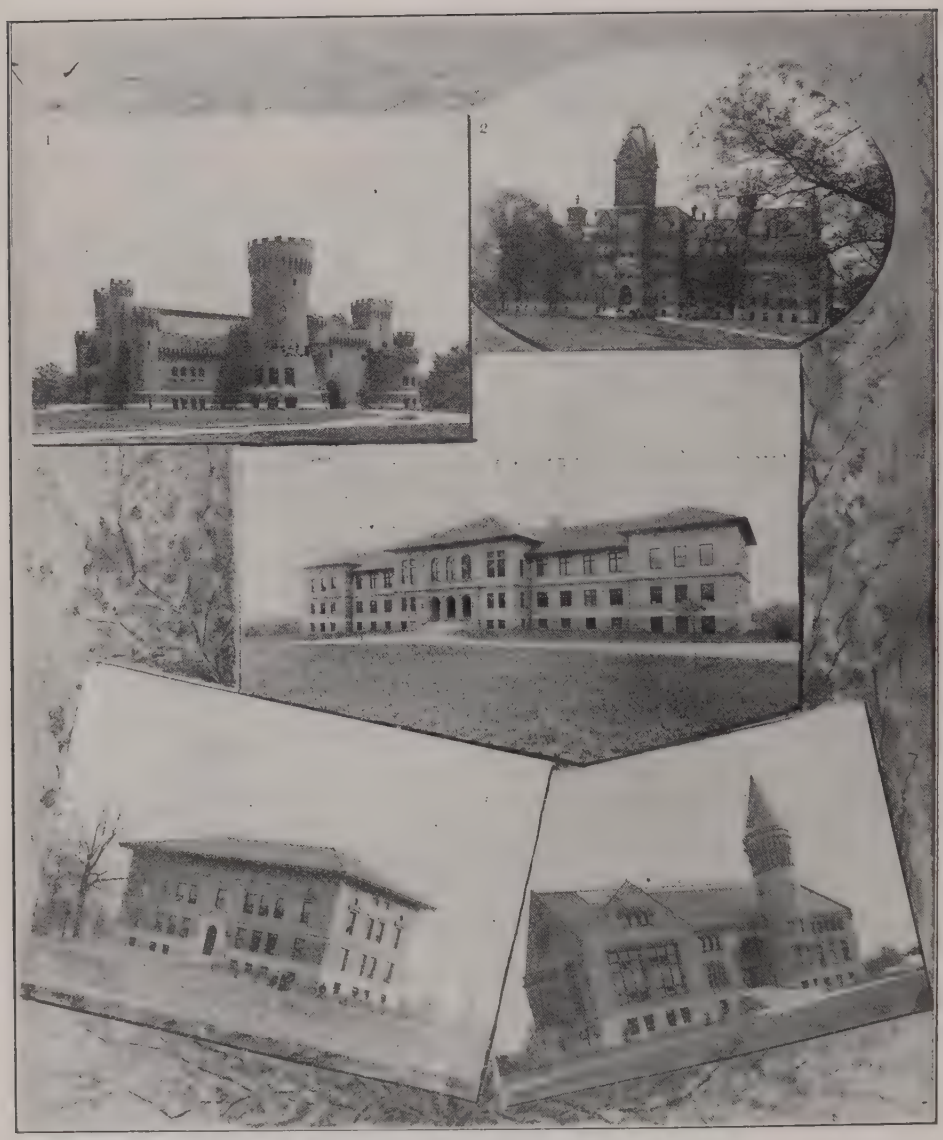
The three-year graded course of study leads to

(a) **the Degree of Doctor of Veterinary Medicine** (**D. V. M.**) or to

(b) **a Certificate of Veterinary Surgeon** (**V. S.**)

Applicants for the doctorate degree are required to complete the prescribed course of study, present at graduation an acceptable thesis, and show evidence of proficiency in arithmetic, grammar, descriptive and physical geography, English composition and rhetoric, U. S. history, Latin or German (one year), physics and the elements of botany before the degree of Veterinary Medicine will be conferred upon them.

Applicants for the certificate of veterinary surgeon (which is not a degree) are required to complete the prescribed course of study, and show evidence of proficiency in arithmetic, geography and grammar before they are granted said certificate of Veterinary Surgeon. (See "Requirements for Admission.")



GROUP OF BUILDINGS USED BY COLLEGE OF VETERINARY MEDICINE

BUILDINGS USED BY COLLEGE OF VETERINARY MEDICINE

Townshend Hall. This building is two hundred and sixty feet long, and varies in width from sixty-four feet to seventy-eight feet. It consists of two stories and a basement, which is fourteen feet high. This structure is one of the finest educational buildings in the middle west. The south end of the second story contains a suite of four rooms which is used as the temporary headquarters of the Veterinary College and Veterinary Museum.

In the basement is a large, specially arranged room, amply lighted and heated, where clinical demonstrations are made, and the judging and scoring of the various kinds of live-stock practically acquired.

Biological Hall. This building is designed for the special accommodation of the departments of Entomology, Zoology, Anatomy and Physiology, and is fully equipped with all the latest and best apparatus for this work. It consists of a basement, in which is done all the work of preparation of subjects for the lecture tables and for the special laboratory work of the advanced students; the first floor on which are the lecture rooms, general and special laboratories, and private rooms for the professor of Entomology and Zoology and his assistants; the second floor similarly arranged for the work in Anatomy and Physiology; and a large wing, in which is a museum and lecture room. The building is fireproof throughout; and in design and general appearance most attractive.

Veterinary Hospital. The Veterinary Hospital, a plain brick building, affords excellent facilities for the treatment and care of animals, and also gives the students the opportunity to become familiar with the diseases to which our domestic animals are subject. It contains box stalls, stalls for cold water applications, a large and well lighted operating hall and two special wards for dogs. The front part of the Hospital contains a demonstration room, a drug dispensary, office with telephone, and a large instrument room.

The upper floor is occupied by the house surgeon and the newly equipped patho-anatomical laboratory. A Free Clinic is held for two hours daily (Saturday included) at this building.

Chemical Hall. This building is occupied by the departments of Chemistry, Mining, Metallurgy, and Pharmacy. It is built of pressed brick laid in red mortar, and cost in the neighborhood of $65,000. The Department of Pharmacy occupies the first floor and basement in the west end of the building, and has a lecture room large enough to accommodate sixty students; a preparation room, a laboratory, a room for supplies, a balance room, a model drug store, and a private laboratory.

The Gymnasium and Armory. This beautiful building was completed last January: The drill hall and gymnasium floor is eighty feet wide by one hundred and fifty feet long. There is a running track around the entire

room, about twelve feet from the floor, back of which is a visitors' gallery, seating about seven hundred persons.

The basement is very high and well lighted. On one side are dressing and locker rooms, the bath room with shower and plunge baths, a lecture room and a band room.

The North Dormitory is situated at the northern limit of Neil Avenue and is just south of the Veterinary Hospital. It affords accommodation for sixty-four students, many of the Veterinary students boarding here.

The South Dormitory stands near Neil Avenue within a few rods of the North Dormitory. It is built of brick, and contains rooms for twenty-four students. Students in this building board themselves.

University Hall. In the North wing of this building Chapel services are held at which the attendance of all instructors and students is expected.

REQUIREMENTS FOR ADMISSION TO VETERINARY COLLEGE

Applicants for admission to the College of Veterinary Medicine must be at least seventeen years of age.

There are three modes of admission to this college :

1—Certificates of the preparatory departments of colleges of approved standing and of Normal schools in Ohio are accepted, if found satisfactory, in lieu of examination for preparatory studies, under the following conditions :

Each certificate must contain a detailed statement of the studies pursued, the text-books used, the amount of work done in each study, the amount of time devoted to it, the date of the examination, and the applicant's rank or standing in it. A copy of the course of study should accompany the certificate, and both should be sent to the University not later than September 1st, 1900.

Blank certificates will be furnished upon application.

Applicants for admission who come from other colleges are required to bring certificates of honorable dismission.

Teachers' certificates (in force) will be accepted for the face value.

2—Graduates of High Schools approved by the University will be admitted without further examination.

3—All other applicants are subject to examination on the group of studies mentioned below.

I. **For applicants for certificate of Veterinary Surgeon ;** Arithmetic, Geography and Grammar.

II. **For applicants who intend to become candidates for the degree of Doctor of Veterinary Medicine :**

1. Arithmetic, Grammar, and Descriptive and Physical Geography.

2. **English Composition and Rhetoric.** Each applicant will be tested as to his ability to write clear and correct English. The test will be the writing of two essays of about two hundred words each. The first essay

will be upon a subject drawn from the condidate's observation or experience; as "A description of my native town," "The most remarkable person I ever met." "My reason for seeking a college education." The second essay will be upon the subject drawn from a list of classics which will be furnished on application.

3. History—History of the United States, Johnston preferred.
4. Latin or German—one year.
5. Physics—Gage, Carhart and Chute, Avery, or Appleton.
9. Botany—Kellerman's Elementary Botany and Spring Flora, or equivalent.

An applicant for admission who may be somewhat in arrears in any given subject, will find opportunity to make up this work in the Columbus High Schools, which are fully accredited by the University.

FEES

Incidental Fees. A charge of fifteen dollars ($15) per year is made against all students under the head in incidental expense. In the case of former students, if this fee is not paid until the second day of the term, one dollar will be added, and for each succeeding day of the delinquency fifty cents will be added.

Laboratory Fees. Students in the laboratories are required to pay fees to cover in part the cost of material consumed and the deterioration of the expensive instruments used by them. The fees charged per term in the College of Veterinary Medicine are as follows:

Anatomy and Physiology (Histology)	$5 00
Chemistry	1 50
Gymnasium	1 00
Pharmacy	1 50

Each student is also required to buy his own supplies, as he needs them, at the General Store Room in Chemical Hall, where laboratory supplies are sold to students at first cost to the University.

Graduation Fee. A fee of five dollars to cover expense of graduation, diplomas, etc., is required of each person receiving a degree from the University; certificate students are exempt from this fee.

Free Scholarship in Veterinary Medicine. If in any county of the state there is no applicant for the free scholarship in Agriculture, then a free scholarship, good for two years, in the College of Veterinary Medicine may be granted. Each of these scholarships is valid for two years from its grant, and covers all college dues (incidental and laboratory). To learn whether the scholarship of a given county for the current year has been granted, inquiries should be addressed to the Secretary or President of your County Agricultural Society. For further information address the Dean of the College of Veterinary Medicine.

OTHER EXPENSES

There are two dormitories on the University grounds for the use of students. Each occupant is charged by the University a rent of a dollar and a half a term.

The South Dormitory affords unfurnished rooms for such students as desire to board themselves, and thus reduce their expenses to a minimum. The expense of living this way is about two dollars per week. Applications for rooms should be made to the President of the University.

Boarding clubs are also formed in the neighborhood of the University. Furnished rooms are rented at seventy-five cents to one dollar a week for each student, and the cost of table board is two dollars to three dollars a week.

Board with furnished rooms can be obtained in private families, within convenient distances of the University, at rates varying from three and a half dollars to five dollars per week. The ruling rate may be taken as four dollars.

The uniform with which the members of the battalion are required to provide themselves costs (without overcoat) about fourteen dollars. It is quiet in pattern, and is designed to be worn daily in place of civilian dress.

The expenses of a veterinary student in the College of Veterinary Medicine during the three-year course may be estimated as follows:

Incidental fees	$ 18 00	$ 18 00	$ 18 00
Laboratory fees	20 50	5 00	1 50
Books and Stationery	15 00	17 00	20 00
Room and Board	125 00	125 00	125 00
Uniform	14 00	.....	.....
	$ 192 50	$ 165 00	$ 164 50

MILITARY SCIENCE AND TACTICS

(CADET SERVICE.)

Under a law of Congress establishing the University, it is required that instruction be given in military science and tactics. In accordance with this provision an officer of the regular army has been detailed to take charge of the Department of Military Science and Tactics; and the Trustees have directed that all male students, except those in the Law College and such others as may be specially excused for physical disability or for having reached the age limit of twenty-five years, shall render two years of cadet service as a condition of graduation. A uniform has been prescribed with which each member is required to provide himself.

From the opening of the year until the Thanksgiving recess cadet service is required four times a week; from Thanksgiving until the Spring

recess cadet service is required twice each week and gymnasium practice twice; from the Spring recess until the first of June cadet service is required four times each week.

The gymnasium is free to all students, but those desiring a locker will be charged a fee of one dollar a term.

THE CONVOCATION

At the opening of the year in September 1900, the daily chapel exercises were abandoned. As a substitute for the short daily exercise, an entire hour is now devoted to a convocation at which the President presides. In addition to devotional exercises an address is delivered upon some suitable topic. During this hour the libraries and laboratories are closed and no other University exercises occur. It is expected that the faculty and students will attend. The hour is definitely fixed at ten o'clock on Wednesday of each week. The public is always welcome at the convocation.

AIDS TO MORAL AND RELIGIOUS CULTURE

One of the most commendable organizations in the University is a branch of the International Young Men's Christian Association, organized in 1883. This association is directly affiliated with the work for young men directed by the college department of the State Y. M. C. A. work. Services are held weekly and voluntary classes for Bible study are successfully organized. The local association has a secretary who devotes his entire time to work among the young men. The management has rented a house at 71 West Eleventh Avenue as a headquarters for the Association. It is hoped that in the near future a permanent home for the Association may be provided.

An equally commendable organization is the Y. W. C. A. affiliated with the State organization. Religious meetings are held regularly at noon on Tuesdays. Occasionally meetings for social purposes are held as provided for by the organization. Both of these organizations are worthy of public consideration.

New students are invited to write to the address below for a hand-book of information concerning the University or for information concerning rooms, boarding or employment. Address J. P. Davies, 71 West Eleventh Avenue, Columbus.

SELF-SUPPORT

There is a large amount of work upon the University farm which is assigned to students, preference being given to those who are studying agriculture. But the University cannot promise work to all applicants. Many students find work in private families, in offices, aud in various occupations, by means of which they defray at least a portion of their

expenses. A person of ability and energy, who is master of a trade or who can do work of any kind, can generally find remunerative employment. It has seldom been known that any student of ordinary energy and industry was obliged to leave the University because of lack of money for necessary expenses, after having been *sixty days* on the ground or long enough to inform himself as to the opportunities of securing employment.

Students should distinctly understand that where they attempt entire or partial self support they should lengthen the term of study. An employment bureau is maintained at the University where the names of those seeking work and of those desiring workers are recorded. Students should report to the Executive Office from time to time as to their needs and their work. This will enable the authorities to be more helpful than otherwise would be possible.

OPENINGS FOR VETERINARIANS

There is a growing demand for men who are skilled veterinarians. The close relationship between veterinary medicine and general medicine—so-called "human" medicine, especially along sanitary lines, has opened to the veterinary profession a large, new field. At present a well qualified veterinarian has his choice of the following fields of labor:

1. As an inspector and assistant in the Bureau of Animal Industry. This is a very desirable berth, protected by the civil service, and the appointments are made for life. The lowest salary paid, to an assistant inspector, is $1200 to $1400 per annum. The inspectors receive higher salaries, depending upon the importance of their respective stations.

2. As an instructor at an agricultural or veterinary college. These positions require the best trained men available, and pay good salaries.

3. As an investigator of infectious and contagious diseases at state agricultural experiment stations. These positions are especially fitted to one who has the scientific ability and taste for original research. There is a great lack of men trained for such scientific work in this country, our veterinary schools formerly teaching little or nothing of the sciences (botany, physics, bacteriology, pathological anatomy, etc.) which form the foundation of a veterinarian's equipment.

4. As a veterinary surgeon in the cavalry service of the United States. A bill now pending before Congress to elevate the standard of the army veterinary surgeon, granting them the rank, privileges and tenure of office of a commissioned officer, will make this service much more desirable than it is at present. However, the position now pays $1200 to $1400 yearly, with perquisites.

5. As a state veterinarian. Many of the states now have state veterinarians, and the time is not far distant when every state in the union will have such an official to attend to the preventable diseases of the animals of his particular state.

6. As a veterinarian to municipal health boards. Already several of our larger cities employ veterinarians as inspectors of abattoirs, butcher shops; of milk and dairy products, and to assist in sanitary work generally. Besides, some cities require the services of a veterinarian to care for and administer to, in sickness, the fire and police horses of the municipality. As time progresses one may look for a greater demand for trained men from this source. Some of these positions pay as high as $2500 annually.

7. As a stock farm manager. A number of veterinarians are employed on stock farms in breeding districts as managers. A thoroughly prepared man should be able to find remunerative positions open to him in such a line of work.

8. Practice. For those wishing to enter upon a regular veterinary practice, desirable locations are still plentiful in many parts of the United States, in towns, cities and counties where there are no regular veterinarians.

There are three times as many animals as there are human beings in the United States. There are ten times as many doctors of medicine as there are veterinarians. It must seem, then, that as the country grows older, which means that the veterinarian will become more often employed than at present, and as the value of our live stock increases, the future must have in store for the skilled veterinarian an opportunity to succeed in his chosen vocation far more favorable than his professional brother, the practitioner of general medicine.

As a glance at the list of alumni will show, a graduate of the College of Veterinary Medicine of the O. S. U., if he has availed himself of his opportunities, should from his collegiate training, be capable of successfully entering upon any of the above cited fields of his chosen profession.

COURSE OF STUDY

The course of instruction extends over three years of nine months each. Thorough instruction in *Veterinary Dentistry*, *Meat Inspection*, *Bacteriology*, and *Practical Operative Surgery* are included in the curriculum.

For class-room work a large number of paper models, wet and dry specimens from the museum, sample horse-shoes, charts, diagrams and drawings, surgical instruments and apparatus are constantly employed to supplement text-book teaching in all classes.

As far as possible the recitation plan of instruction, supplemented by clinical demonstration, is adhered to by the teachers of this college.

It is the endeavor to make the course of study as broad and exhaustive as is consistent with the time (three years) available, and to touch upon all those branches which underlie a thorough veterinary education.

PRACTICAL INSTRUCTION

FREE CLINICS are held from 10 to 12 M. daily (Saturday included) at the Veterinary Hospital that the students may become in a practical way familiar with the care and treatment of diseased and injured animals.

During the clinic hours the students are required to assist the instructor in all surgical operations (castrations, spayings, dental work, etc.) and to administer all medicines to sick animals.

During the College year (no clinics are held in vacations) of '98-'99 and the first term of '99 the following number of cases were treated at the daily clinics:

Lamenesses	404
Dental	369
Major Surgical	351
Minor Surgical	588
Sporadic Internal Diseases	360
Infectious and Contagious Diseases	43
Examinations for Soundness	8
Obstetrical Operations	5
Determination of Age	2
Total	2,130

Besides the free clinics a large number of animals are left in the Hospital for treatment. Second and Third Year Students are placed in charge of these cases, and are required to keep a careful daily record of each case, administer all medicines, and apply bandages, wound dressings, etc., under the supervision of the Hospital Staff. Thus students become thoroughly familiar with the duties of a routine veterinary practice, and are thereby more forcibly impressed with the theoretical instruction they receive in the class room.

A herd of fifty cattle, a drove of hogs, and several horses are kept on the University farm. These animals furnish a great deal of clinic material during the College year. The University dairy herd is tested once a year with tuberculin. This test is conducted by the students, under the direction of the instructors, giving valuable practical experience in the modern method of diagnosing tuberculosis.

OUTLINE OF THE COURSE OF STUDY

FIRST YEAR

First Term—Chemistry (5); Physiology (3); Histology (5); Anatomy (5); Cadet Service.

Second Term—Chemistry (5); Physiology (3); Histology (5); Anatomy (5); Cadet Service.

Third Term—Chemistry (5); Physiology (3); Physiological Chemistry (5); Anatomy (5); Cadet Service.

SECOND YEAR

First Term—Breeds of Live Stock (4); Materia Medica (5); General Pathology (4); Helminthology (1); Clinic (12); General Surgery (3); Cadet Service.

Second Term—Stock Breeding (4); Materia Medica (5); Theory and Practice (3); Surgical Diseases (3); Clinic (12); Pathology Laboratory (6); Cadet Service.

Third Term—Stock Feeding and Hygiene (4); Pharmacy Laboratory (5); Theory and Practice (3); Surgical Diseases (3); Clinic (12); Pathology Laboratory (6); Cadet Service.

THIRD YEAR

First Term—Theory and Practice (3); Clinic (12); Surgical Diseases (3); Canine Diseases (3); Milk Inspection (1); Pathology Laboratory (6); Principles of Horseshoeing (3).

Second Term—Theory and Practice (3); Practice in Operating (3); Clinic (12); Meat Inspection (4); Bacteriology (6); Obstetrics (3); Thesis (2).

Third Term—Theory and Practice (3); Surgical Diseases (3); General Therapeutics (3); Clinic (12); Opthalmology (2); Canine Diseases (3); Thesis (2).

COURSE IN VETERINARY MEDICINE

NOTE—The figure in parenthesis following the name of each study indicates the number of that study in its department. A full description of department work follows this statement of Courses.

FIRST YEAR

FIRST TERM.	Credit hours	SECOND TERM.	Credit hours	THIRD TERM.	Credit hours
Agr'l Chemistry (1) Principles.	5	Agr'l Chemistry (8) Organic.	5	Agr'l Chemistry (9) Applications.	5
Physiology (1) Human Anatomy.	3	Physiology (1) Physiology.	3	Physiology (1) Physiology.	3
Physiology (4) Histology.	5	Physiology (4) Histology.	5	Physiology (4) Phys. Chemistry.	5
Veterinary Medicine (11) Anatomy.	5	Veterinary Medicine (12) Anatomy.	5	Veterinary Medicine (13) Anatomy.	5
Cadet Service.		Cadet Service.		Cadet Service.	

SECOND YEAR

Agriculture (8) Breeds of Live Stock.	4	Agriculture (9) Stock Breeding.	4	Agriculture (10) Stock Feeding and Hygiene.	4
Pharmacy (12) Materia Medica.	5	Pharmacy (13) Materia Medica.	5	Pharmacy (18) Laboratory.	5
Veterinary Medicine (14) General Pathology.	4	Veterinary Medicine (15) Theory and Practice.	3	Veterinary Medicine (16) Theory and Practice.	3
Zoology (8) Helminthology.	1	Veterinary Medicine (18) Surgical Diseases.	3	Veterinary Medicine (18) Surgical Diseases.	3
Veterinary Medicine (19) Clinic.	3	Veterinary Medicine (19) Clinic.	3	Veterinary Medicine (19) Clinic.	3
Veterinary Medicine (24) General Surgery.	3	Veterinary Medicine (34) Pathology Laboratory.	3	Veterinary Medicine (34) Pathology Laboratory.	3
Cadet Service.		Cadet Service.		Cadet Service.	

THIRD YEAR

FIRST TERM.	Credit hours	SECOND TERM.	Credit hours	THIRD TERM.	Credit hours
Veterinary Medicine (20) Theory and Practice.	3	Veterinary Medicine (21) Theory and Practice.	3	Veterinary Medicine (22) Therapeutics.	3
Veterinary Medicine (19) Clinic.	3	Veterinary Medicine (25) Practice in Operating.	3	Veterinary Medicine (21) Theory and Practice.	3
Veterinary Medicine (18) Surgical Diseases.	3	Veterinary Medicine (19) Clinic.	3	Veterinary Medicine (19) Clinic.	3
Agriculture (18) Milk Inspection.	1	Veterinary Medicine (27) Meat Inspection.	4	Veterinary Medicine (18) Surgical Diseases.	3
Veterinary Medicine (31) Canine Diseases.	3	Physiology (6) Bacteriology.	3	Veterinary Medicine (33) Opthalmology.	2
Veterinary Medicine (26) Horse Shoeing.	3	Veterinary Medicine (23) Obstetrics.	3	Veterinary Medicine (32) Canine Diseases.	3
Veterinary Medicine (36) Pathology Laboratory.	3	Thesis	2	Thesis	2

THESIS

As a requisite for graduation candidates for the degree of D. V. M. must present an acceptable thesis embodying the results of a special research. The subject must be announced to the President of the University (dependent upon the written approval of the head of the department in which it lies) not later than the beginning of the second term of the third year. The completed thesis must be submitted not later than the second Saturday before Commencement Day.

Candidates for a Certificate of Veterinary Surgeon are not required to present a thesis.

SUBJECTS OF INSTRUCTION

VETERINARY ANATOMY

(VET. MED. 11-12-13)

This subject is taught by lectures, recitations, and demonstrations amplified by drawings, charts, paper models and prepared specimens from recent subjects. First year, three terms, five hours per week.

Each student is required to dissect every part of the horse, and after becoming familiar with this type, the dissection of the ox and dog is taken up. All material for dissecting is furnished *free* by the College, an abundance being always available to the student.

The dissecting room is well lighted and heated, electric lamps affording ample light for work at night. Students are required to put in six months of the first year (ten hours per week) making practical dissections.

Students will find it to their advantage at any time during their college course, to work in the dissecting room whenever time permits, and in the colder months of the year plenty of material is constantly at hand for the use of those volunteering work in anatomical laboratory.

BACTERIOLOGY

(PHYSIOLOGY 6)

This subject is taught by a course of lectures and laboratory work. The general study of bacteria, their morphological peculiarities, etc., is taken up, then the specific study of the relation of germs to disease. In the laboratory students are taught to make nutrient media, inoculate animals, make culture-tubes, flow plate cultures, and perform the usual manipulations incident to the artificial cultivation of pathogenic germs.

The laboratory is well equipped with sterilizers of various kinds, straining fluids, and high-power microscopes. Second term, third year.

CANINE PRACTICE

(VET. MED. 31-32)

This important branch of Veterinary Science, which has been so neglected in the past and which is so important to the practitioner of the present time, is taught by recitations, lectures, and practical demonstrations in the daily clinics and on subjects anæsthetized for the operating table.

The course consists of two terms of three months each. The first term lectures shall be given on the origin and history of the Dog, psychical characteristics, zoological position of the Dog with a comparison of the different breeds of Dogs, their peculiarities, habits, adaptation, etc.

Also during this term diseases of the digestive tract and respiratory tract are considered by recitations and by practical demonstrations in the clinics.

The second term consists of recitations on diseases of the urinary organs, diseases of the circulatory system, diseases of the nervous system, diseases of the skin, infectious and contagious diseases, wounds and their treatment and diseases of the eye and ear.

This term also students are expected to perform all the important operations, administer anæsthetics, etc., under the supervision of the instructor. Experimental animals are furnished free by the department.

CHEMISTRY

(AGRICULTURAL CHEMISTRY 1-8-9)

First term. Principles of chemistry and chemical nomenclature. Lectures and text-book work for the first four weeks, five times a week; then lectures twice a week on the chemistry of non-metals, and laboratory practice six hours per week.

Second term. Organic chemistry: lectures twice a week; laboratory practice three times a week.

In connection with the lectures Norton's Chemistry, or any other good text-book, is used. The laboratory work consists of a complete systematic course in qualitative analysis. As a guide Weber's Select Course in qualitative analysis is used. This course is completed in this term.

Third term. Applied chemistry: lectures twice a week; laboratory three times a week.

In this term the lectures embrace the following topics: Ingredients of plants, organic and inorganic, essential and non-essential; sources of plant food, air and soil; nature of soil, mechanical portion, nutritive portion, assimilable and reserve plant food. The laboratory work of this term begins with the quantitative analysis of simple salts as sodium sulphate, potassium chloride, and continues with the analysis of feeding stuffs concluding with the short method of water analysis, and the analysis of milk, butter and cheese.

SMALL ANIMAL WARD

GROUP OF STUDENTS AND PATIENTS—VETERINARY HOSFITAL

GENERAL PATHOLOGY

(VET. MED. 14)

Instruction in General Pathology consists of lectures and recitations and is given to students of the second year. This course of study forms the foundation for Theory and Practice (Special Pathology), and embraces the study of the various disease processes.

The lectures are supplemented by demonstrations of museum specimens, and by post-mortem examinations upon all cases which die in the College Hospital. The processes especially studied are: Inflammation, Functional Disturbances, Fever, Anatomical Changes, Hyperæmia, Anæmia, Hemorrhage, Thrombosis, Embolism, Degenerations, Tumors, Stones, and Concrements. First term, four hours per week.

HISTOLOGY

(PHYSIOLOGY 4)

This course is given by placing the student in the laboratory and making him thoroughly familiar with the use of the microscope and its various parts. Each student is provided with a microscope for his own personal use during the course. The study of simple tissues is first taken up, then the organs. Students are taught how to cut sections, stain and mount each preparation, taking the tissue from the original animal and following the process step by step until a permanent mount of the same is made. First year, first and second terms.

MATERIA MEDICA AND PHARMACY

(PHARMACY 12-13-18)

The course in Materia Medica extends over a period of six months consisting of about one hundred and thirty lectures.

This course includes all of the medicines of the U. S. Pharmacopœa that are used in the Veterinary Medicine with the addition of all new medicines as they appear from time to time. Special attention is given to the physical characteristics of Organic and Inorganic Drugs, also their alkaloids, solubility, actions and uses, posology and application to the various domestic animals.

Special demonstrations are given in prescription writing so that the student becomes familiar with all the important points in writing prescriptions.

Pharmacy is taught by lectures and practical work in the laboratory. In the laboratory the student is required to make all the common preparations such as, tinctures, fluid extracts, extract boluses, ointments, blisters, etc. Practical work is given in dispensing drugs at the Hospital where all the prescriptions for the clinical patients are compounded by the students under the supervision of the clinical staff.

MEAT INSPECTION

(VET. MED. 27)

Fifty-five recitations and lectures are given on the subject of Meat Inspection. These lectures include the normal character of the various organs of the meat-producing animals; rules and regulations for the inspection before and after slaughter; diseases due to the infestation with animal parasites; diseases due to the infection with vegetable parasites; putrid meat; over-heated meat; emaciated meat; fœtal meat; natural death; abnormal odors and colorations of meat and fat; imperfect bleeding; disposition of diseased meat, etc.

As this course embraces much morbid anatomy, it is just as valuable to those who intend entering regular veterinary practice as to those who contemplate taking the civil service examination for meat inspectors in the Bureau of Animal Industry. (See Openings for Veterinarians.)

MILK INSPECTION

(AGRICULTURE 18)

The student will be given a general knowledge of what constitutes pure dairy products, such as milk, cream, butter and cheese, together with the common method of adulteration, such as skimming, watering, preserving with chemicals injurious to health, and the effect of sanitary conditions on the keeping qualities and healthfulness of the same.

This work to be given by suitable lectures and laboratory practice.

OBSTETRICS

(VET. MED. 23)

The course in Obstetrics is given during the third year, one term being devoted to this branch. The lectures, recitations and class-room demonstrations are amplified as much as possible by taking advantage of the clinical material afforded by an environing live-stock and dairying district.

Students have a particular advantage in coming in actual contact with cases of dystokia, fœtal, placental, and maternal, and are required to assist in all obstetrical operations upon animals in labor, under the direction of the instructor in this branch.

The College is supplied with all the obstetrical instruments and devices practically useful in such work, and the student is made thoroughly familiar with their use.

OPHTHALMOLOGY

(VET. MED. 33)

A short course of twenty lectures is given on diseases of the eye. This course includes: Methods of examining the eye; the use of the ophthalmascope; use of artificial and natural illumination; use of mydriatics;

A PRACTICUM IN PHYSICAL DIAGNOSIS

A PRACTICUM IN VETERINARY DENTISTRY

diseases and treatment of the organs surrounding and adjacent to the bulbus; diseases of the bulbus and their treatment. The lectures are supplemented by clinical demonstrations, and the students are given practice in the use of the most practical instruments for eye examinations. Third year, third term, two hours per week.

PATHOLOGICAL ANATOMY

(VET. MED. 34-36)

This is a laboratory course supplemented by lectures. The course consists of three laboratory periods per week for an entire year, beginning with the second term of the second year and ending with the first term of the third year. The student is taught the correct methods of making autopsies and how to judge correctly antimortem and postmortem changes in the tissues.

The holding of autopsies, preservation of tissues, the preparation, staining, microscopical examination and description of pathological tissue sections is done by the student. This course also includes the study of ecto- and ento- parasites and pathologic bacteriology.

PHYSICAL DIAGNOSIS

(VET. MED. 20)

This includes: Methods of examining diseased animals; use of the clinical thermometer; determination of the pulse and respirations; peristalsis; percussion; ausculation; examination of urine; significance of nasal discharges; coughs; dyspnœ; change in habitus, etc. The subject is taught by lectures supplemented by demonstrations on living animals, preparing the student for clinical practice which it preliminates.

PHYSIOLOGY

(PHYSIOLOGY 1)

The course of instruction covers the whole field of physiology, and includes lectures, recitations, demonstrations and laboratory work. The laboratory is well equipped with skeletons, papier-mache manikin, and many models, including models of the ear, eye and larynx, etc. The lectures begin with a study of the structure of bones, composition of the blood, muscles, nervous system, then follows a study of the physiological functions of the alimentary tract, structure and functions of the skin, respiratory tract, special senses, and urino-genital tract. These lectures are supplemented by practical laboratory work and physiological dissections. First year, first, second and third terms, three hours per week.

PHYSIOLOGICAL CHEMISTRY

(PHYSIOLOGY 4)

This course consists of lectures and laboratory work and includes the study of the chemistry of the various organs and fluids of the body. A course in the analysis of urine follows during which the student learns the most practical methods of chemically testing urine for albumen, sugar, salts, hæmoglobin and bile coloring matter. Crystalizations and the presence of tube-casts, epithelium, etc., are microscopically studied. First year, third term.

PRINCIPLES OF HORSE-SHOEING

(VET. MED. 26)

This subject is taught by a series of about forty lectures, recitations and demonstrations upon prepared specimens and clinical cases, and embraces the following: The anatomy of the horse's foot; relationship of the outer-skin to the foot; parts secreting the horn; how horn grows; physiological mechanicism of the foot; relationship of the foot to the rest of the limb and the influence of conformation over forms of hoofs; flight of feet; forms of hoofs; judging horses for shoeing; preparation of the hoof for the shoe; summer and winter shoes; fitting shoes to the hoof; nails; hoof nurture; shoeing for defective gaits; shoeing for lamenesses; shoeing for faulty conditions of the horny capcule; use of rubber pads, buffers, etc. First term, third year, three hours per week.

By arrangement with a near-by horse-shoer most of the pathological shoeing is done under the immediate supervision of the instructor in horse-shoeing. It is proposed to soon have a regularly equipped and appointed shop for shoeing horses at the Hospital, which will greatly facilitate the teaching of this important branch.

SURGERY—GENERAL, SPECIAL AND OPERATIVE

(VET. MED. 24-25-18)

General Surgery includes the use of antiseptics in wound healing; suturing and bandaging of wounds; application of bandages to the various parts of the body; casting and securing animals for operations; the use of local and general anaesthesis. First term, three hours per week.

Special Surgery. This consists of lectures and recitations on the different surgical diseases, commencing with the head and neck, and following with the maladies affecting the trunk and limbs. Special attention is given to the cause, symptoms and treatment of lamenesses. Second, third, and fourth (third year) term, three hours per week.

Operative Surgery. The course in operative surgery consists of practical surgical manipulations performed by students of the third year upon narcotized animals purchased for the purpose.

Each student is required to have performed the following operations before he can receive credit for this course :

1. Trephining : Frontal ; superior maxillary.
2. Tooth extraction ; Molar ; pre-molar.
3. Neurectomy : Medial , plantar ; digital ; superior maxillary.
4. Opening of the gutteral pouches.
5. Tracheotomy.
6. Myotomy : Caudal; sterno-hyo-thyroid (" cribbing " operation).
7. Phlebotony : Jugular.
8. Probanging.
9. Reduction of Hernia.
10. Paracentesis ; Abdominal ; thorasic.
11. Catheterization : Male ; female.
12. Urethrotomy.
13. Amputation of the Penis.
14. Tenotomy: Flexor ; peroneus (" string halt " operation); cunean.
15. Castration : Male and female. (Dog, Horse, Ox.)
16. Actual Cautery : Point ; line (practice with thermo-cautery).
17. Moeller-Peters Spavin operation.

THEORY AND PRACTICE OF VETERINARY MEDICINE

(VET. MED. 15-16-20-21)

The instruction in Theory and Practice of Veterinary Medicine is given to students of the second and third years.

Second year students take up the study of the non-infectious, sporadic diseases, including diseases of the digestive tract, circulatory system, nervous system, respiratory tract, urinary tract, and skin.

Third year students study the diseases due to the infestation with animals and vegetable parasites, keeping well in mind the prophylactic treatment most applicable to each disease out-break.

The recitations and lectures are supplemented by the use of dry and wet museum specimens and by clinical demonstrations upon animals in the Veterinary Hospital and Clinic. (See Clinic and Veterinary Hospital.)

ZOOLOGY

(ZOOLOGY 8)

Parasites of Domesticated Animals. A course of lectures devoted to the most important animal parasites that infest domesticated animals, including such forms as the liver, fluke, the tape-worms, trichinae and other round-worms ; scab mites, ticks, lice, bot-flies, screw-worms, etc.

The different species will be illustrated as fully as possible by means of specimens, microscopic preparations, charts and drawings, and particular attention will be given to the life-history of the species treated. While the

STUDENT WORK IN ANIMAL MECHANICS

LIVE STOCK JUDGING ROOM, TOWNSHEND HALL

primary purpose of the course is to give a familiarity with the appearance of the different stages of parasitic animals that is essential in the diagnosis of parasitic diseases and in meat inspection, the examples studied will also serve to illustrate some of the most important principles of the science of Zoology. First term, one hour per week.

ZOOTECHNY

(AGRICULTURE 8-9-10)

Zootechny treats of the production of the normal useful animal. The instruction is given in three parts :

(1) Lectures and recitations upon the types and breeds of different kinds of domestic animals, including their classification, characters, development, distribution and breeder's organization. Practicums in judging and scoring the different types of domestic animals.

(2.) Lectures and recitations upon the principles governing the choice and breeding of animals, including heredity, variation, selection, prenatal influence, fecundity and sex. Practicums in tracing and writing pedigrees.

(3.) Lectures and recitations upon the principles and practice in feeding, hygiene and management, including the laws of nutrition, the character of food stuffs and food requirements for maintenance, growth, fattening, and for the production of wool, milk and work. Practicums in calculating digestibilities, nutritive ratios and feeding standards.

A WINTER SCENE ON THE CAMPUS

LIST OF MATRICULATES

Anders, Thomas Olin	Ohio
Bender, John Ellis	Ohio
Betts, Sugar Turner	Ohio
Breckenridge, William Kemper	Ohio
Brown, Harry Wilbur	Ohio
Choate, John Wesley	Ohio
Cook, George Edward	Ohio
Dock, Norton	Ohio
Forrester, Harry Arthur	Ohio
Funes, Tomas	South America
Heacock, Clyde Clark	Ohio
Henderson, Charles Logan	Ohio
Imes, Marion	Ohio
Irwin, Albert N.	D. C.
Johnson, Theodore Charlemagne	Ohio
Lamb, Morgan Baxter	Ohio
Langdon, Elmer	Ohio
Lipp, Charles Clinton	Ohio
Meiche, Louis Hayes	Ohio
Metzger, Edward Louis	Ohio
Moreno, Regino Teodoro	South America
McClelland, Robert Lyle	Ohio
McLeod, Murdock	Michigan
Pettiford, Oscar Collins	Ohio
Rietz, John Harrison	Ohio
Sater, Clinton Huron	Ohio
Severn, Warren	New York
Wishard, William Howard	Penna.

LIST OF STUDENTS FROM OTHER DEPARTMENTS OF THE UNIVERSITY, WHO HAVE REQUIRED WORK IN THE COLLEGE OF VETERINARY MEDICINE

Abbott, George Franklin	Ohio
Andrews, Harry Sherman	Ohio
Arney, Samuel Hurd	Ohio
Atherton, William Thomas	Ohio
Bailey, Alva Caleb	Ohio
Beale, Harry Glenn	Ohio
Beneker, Robert Edgar	Ohio
Bigger, Paul Breese	Ohio

Biggin, Orlo L.	Ohio
Cahill, Verril W.	Ohio
Case, Claude Henry	Ohio
Codding, Harry Wylder	Ohio
Commons, Horace Joseph	Indiana
Conradi, Albert Frederick	Ohio
Creamer, Jesse Carlton	Ohio
Crumrine, George Ray	Ohio
Davis, William Woolson	Ohio
Day, Albert Edward	Ohio
Dunlap, S. Arthur	Ohio
Duval, Harding Hayes	West Virginia
Dwyer, Horace Earl	Ohio
Fisher, Milo Eddison	Ohio
Fox, Louis Henry	Ohio
Frink, Clarence Benjamin	Colorado
Galehouse, David William	Ohio
Gault, Thomas Chambers	Ohio
Gerdeman, John Fred	Ohio
Hamilton, Frank Enward	Ohio
Hanna, Charles Mitchell	Ohio
Hanna, Hortie Leroy	Ohio
Herrick, Hobart C.	Ohio
Hill, George Baxter	Ohio
Hudson, James Frank	Ohio
Hunt, Claude Percival	Ohio
Hynes, Clifton Edwin	Penna.
Innis, Byron Schofield	Ohio
Irwin, Arthur Milton	Ohio
Jennings, Otto Emery	Ohio
Johnson, Homer Edward	Ohio
Jones, Lloyd	Ohio
King, Michael Albert	Ohio
Linberg, Charles Guy	Ohio
Mallow, Harry Campbell	Ohio
Mangold, Frank	Ohio
Morton, Charles Owen	Ohio
Mears, William Holt	Ohio
Miller, Edward	Ohio
McMillan, Fred D.	Ohio
Nelson, Fred Walker	Ohio
Neptune, Orrin Bird	Ohio
Newcomb, Howard Robinson	Ohio
Osborne, Harry Lester	Ohio
Paddack, Benjamin	Ohio
Patterson, Andrew Wylie	Ohio
Pessell, J. Bruce	Ohio
Portman, Herbert Rudolph	Ohio
Ross, John Langborn	Ohio
Ruhl, George Pressley	Penna.
Ruhlen, LaMotte	Ohio
Rutan, David William	Ohio
Rutan, Hiram Edgar	Ohio
Schwendemann, Frank Jacob	Ohio
Shaw, Edward Lee	Ohio
Siler, Leonard Edgar	Ohio

Smith, Wilford B.	Ohio
Spohn, Louis Narcissus	Ohio
Stahl, Price Ewing	Ohio
Steward, Charles Benjamin	Ohio
Tarpning, Clifton Carmel	Ohio
Tobias, Deane Abram	Ohio
Townsend, Melville West	Ohio
Waite, Arthur Thompson	Ohio
Wampler, Milton Eugene	Ohio
Washburn, Wayne	Ohio
Watkins, Salem Francis	Ohio
Welch, Fred Clair	Indiana
Wentz, John Earl	Ohio
Whitehead, Albert	Ohio
Wilson, Sherman	Ohio

A WINTER SCENE ON THE CAMPUS

ALUMNI

Bennett, Samuel E., 1890, D. V. M.....Kansas City, Mo.
Chief Inspector, Bureau of Animal Industry.

*Boyd, James G., 1897, D. V. M .....

Brier, Harvey E., 1890, D. V. M.....Tippecanoe City, O.
Practitioner.

Brumley, Oscar V., 1897, V. S.....Columbus, O.
Materia Medica and Canine Practice, O. S. U.

Canfield, Charles H., 1897, D. V. M.....Kansas City, Mo.
Meat Inspector, Bureau of Animal Industry.

Clawson, Clarence Alford, B. Sc , 1900, D. V. M.....Kansas City
Meat Inspector, Bureau of Animal Industry.

Detchon, A. B , 1899, V. S.....Boardman, O.
Practitioner.

Daily, Henry G., 1892, D. V. M.....Wooster, O.
Practitioner.

Early, Franklin E., 1893, D. V. M.....St. Louis, Mo.

Eddy, William, 1900, D. V. M.....Cleveland, Ohio
Practitioner

Ellis, Charles, 1893, D. V. M.....St. Louis, Mo.
Veterinarian to the Board of Health.

Emerick, David A., 1897, V. S.....West Milton, O.
Practitioner.

Fischer, Paul, B. Sc., 1891, D. V. M.....Columbus, O.
Professor of Pathological Anatomy, O. S. U.

Foley, William J., 1894, D. V. M., M. D.....Lexington, Ky.

Francis, Mark, 1887, D. V. M.....College Station, Texas
Professor of Veterinary Medicine.

Griffin, Frank, 1900, V. S.....Columbus, Ohio

Hamilton, Frank A., D. V. M.....DuBois, Pa.
Practitioner.

Hammond, Harry James, 1900, D. V. M.....Kansas City, Mo.
Meat Inspector, Bureau of Animal Industry.

Harbage, Arnett, 1893, D. V. M .....West Jefferson
Farmer.

Hart, Arthur Clark, 1900, V. S. (Ont.), V. S.....St. Joseph, Mo.
Meat Inspector, Bureau of Animal Industry.

Jones, William F., 1896, D. V. M.....Cincinnati, O.
Student Miami Medical College.

Lavery, William F., 1890, D. V. M.....Kansas City, Mo.
Meat Inspector, Bureau of Animal Industry.

Loveberry, Clarence, 1896, D. V. M.....Minneapolis, Minn.
Meat Inspector, Bureau of Animal Industry.

Lusk, William V., 1893, D. V. M,.....Santa Clara, Cuba
Veterinary Surgeon (first class), U. S. 2d Calvary.

Mawer, George C., 1892, D. V. M.....Oak Harbor, O.
Practitioner.

Mead, Rollo N., 1895, D. V. M.....St. Paul, Minn.
Meat Inspector, Bureau of Animal Industry.

Mendenhall, Maurice, 1893, D. V. M.....West Alkton, O.
Practitioner.

Miller, Henry P., 1897, D. V. M.....Sunbury, O.
Practitioner and Farmer.

Morrow, Charles James, 1900, D. V. M.....St. Joseph, Mo.
Meat Inspector, Bureau of Animal Industry.

Murray, Frank E., 1892, D. V. M.....Omaha, Neb.
Meat Inspector, Bureau of Animal Industry.

Myers, Murray J., 1897, V. S.....St. Louis, Mo.
Meat Inspector, Bureau of Animal Industry.

Powell, Norman C., 1895, D. V. M.....Damascus, O.
Practitioner.

Priest, Frederick, 1895, D. V. M.....Newark, O.
Practitioner.

Smith, Nathaniel B., 1893, D. V. M.....Kansas City, Mo.
Meat Inspector, Bureau of Animal Industry.

Sparhawk, William T., 1899, V. S.....Louisville, Ky.
Meat Inspector, Bureau of Animal Industry.

Stevens, James T., 1897, V. S.....Urbana, O.
Practitioner.

White, David Stuart, 1890, D. V. M.....Columbus, O.
Dean, College of Veterinary Medicine, O. S. U.

Worcester, Warner, 1900, V. S.....Chicago, Ill.
Meat Inspector, Bureau of Animal Industry.

*Deceased.

LIST OF TEXT BOOKS

Chemistry—*Norton's Elements of Chemistry; *Weber's Qualitative Analysis.

Physiology—Smith's Veterinary Physiology; Martin's Human Body.

Histology—*Stoehr's Histology; Gottheil.

Anatomy—*Strangeway (new edition); Chauveau; McFadyean.

Zootechny—*Curtice's Breeds; *Miles' Breeding; *Henry's Feeding.

Materia Medica—*Finley Dunn; Hoare; White.

Pathology—*Green; Zeigler.

*Physical Diagnosis—White-Fischer-Malkmus.

General Surgery—Fleming; Moeller.

Theory and Practice—*Friedberger and Froehner; Williams; Hanson.

Surgical Diseases—*Moeller's Operative Surgery; Liautard.

Pharmacy—*U. S. Pharmacopoea.

Meat Inspection—*Fischoeder-Peters; Ostertag.

Milk Inspection—*Farrington and Woll; Summerfield-Peters.

Canine Practice—*Mueller-Glass; Mills.

Practice in Operating—*Williams-Pfeifer; Cadiot-Bitting.

Bacteriology—*Fraenkel; Mosselman and Lienaux-Dinwiddie.

Obstetrics—*Dalrymple; Fleming.

Principles of Horse Shoeing—Leisering-Hartman-Dollar; Lungwitz-Adams.

Ophthalmology—Van-Mater; Moeller; Beyer's Plates.

*Books marked with an asterisk are required to be purchased by the student; the other works are highly recommended.

For information concerning text-books, etc., address,

F. R. WEST,

Ohio State University, Columbus.

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THE OUTLOOK FOR THE LIVE STOCK INDUSTRY IN OHIO

BY

THOMAS F. HUNT,

Dean of the College of Agriculture and Domestic Science,
Ohio State University.

EXCERPT FROM THE PROCEEDINGS OF THE FIFTY-SIXTH ANNUAL STATE AGRICULTURAL CONVENTION.

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THE OUTLOOK FOR THE LIVE STOCK INDUSTRY IN OHIO.

During the first half of this century, Ohio and Kentucky, but especially Ohio, was the center of the live stock trade in America. Let us pause here and turn back the pages of history to July 13, 1787, when the Congress of Confederation, assembled in New York City, enacted the famous ordinance of the Northwest Territory. Just fifteen days after this memorable ordinance was enacted, Congress passed an act, which disposed of five million acres of land in Ohio at about ten cents per acre. One and one-half million acres of this land went to the Ohio Company, which the next year established the first permanent settlement in Ohio at the mouth of the Muskingum river. Three and one-half million acres were said to have been "for private speculation in which many of the principal characters of America were concerned," and out of which grew the famous Scioto Company, called by McMaster, the first great land job of the Republic.

The same Congress granted to John Cleve Symmes two million acres between the Little and Great Miamis. By every art known to the land agent, the tide of immigration into the Ohio Valley was swelled into a torrent. The canvas-covered wagon with the sign "To Marietta on the Ohio" carried so much of the fresh, young, able blood of the East as to create alarm. One authority estimates that ten thousand immigrants went by Marietta in 1788. In the East anti-emigration pamphlets were issued. One of these represented a stout, ruddy, robust, well-dressed man on a fat, sleek horse, with the label, "I am going to Ohio," meeting a pale and ghastly skeleton of a man, scarcely half dressed, on a wreck of what was once a horse, with a label, "I have been to Ohio."

The Muskingum, the Scioto and the Miami Valleys were soon populated and very productive they proved to be, but it was necessary to do something besides produce. It was necessary to sell. To wagon flour over the Allegheny Mountains on almost impassable roads to New York, Philadelphia, or Baltimore, was largely out of the question.

When that band of forty-seven immigrants landed on the bank of the Muskingum and thus began the first permanent settlement of Ohio, Louisiana was a Spanish territory, and New Orleans was a considerable and thriving town, cut off, however, from trade with the Ohio Valley by Spanish arms, which guarded the Mississippi river.

On the year before the Indiana side of the Ohio was permanently settled, a general, and of course a colonel, of Kentucky, by name James Wilkinson, determined to raise this embargo, which by diplomacy, that is, by downright lying, he succeeded in doing, and in January, 1788, twenty-five flat boats loaded with flour, bacon, tobacco, butter and hams, guarded by one hundred and fifty armed, well drilled and officered men, moved out into the Ohio and floated down the Missis-

sippi river to the Crescent City. Thus opened a hazardous but profitable trade to the Ohio valley settlers. It was long before the days of steamboats. To float flatboats down the Ohio and Mississippi rivers was sufficiently hazardous, but to walk back through a wild, and sometimes hostile, country was a task only for adventurous and courageous men. There was, however, no lack of men willing to strive for the profits, and the trade grew to tremendous proportions, which continued until after the war of 1812.

With the amazing immigration into and the development of the Ohio valley it was not many years before the supply exceeded the demand, and it was seen that some other outlet must be found. At this juncture George Renick, of Ross County, proposed driving fat beeves to the Eastern seaboard. In 1805 he crossed the Alleghenies with sixty-eight head of fat steers, and drove them into Baltimore in good condition, selling them at a profit. Thus a new industry started, which, as the flour trade with New Orleans had formerly done, grew with great rapidity, and continued for many years. In 1817 Felix Renick drove one hundred head of fat steers through to Philadelphia, receiving for them one hundred and thirty-four dollars per head. A year later George Renick drove through to New York the first Western cattle ever seen there, which sold for sixty-nine dollars per head.

The Virginia practice of grazing cattle and fattening them out of doors with shock corn was transplanted to this soil and climate, and thus became a fixed custom of American agriculture. Imported with this practice from Virginia were some English cattle, which subsequently exerted a far-reaching influence. They had much to do in making the Ohio valley the cradle of shorthorn breeding in America. Many were the importations of shorthorn cattle into this region, but none were more noteworthy, perhaps, than those of the Ohio Importing Company, a company formed in 1833 by about fifty men of the Scioto valley, in which Felix and George Renick were again the leading spirits. In 1836 this company sold at public auction forty-three imported shorthorns at an average of eight hundred and three dollars and twenty-five cents. In 1837 the same company sold fifteen head at an average of one thousand and seventy-one dollars and sixty-five cents.

There is not time in a brief talk of this kind to trace the rise and decadence of the dairy industry on the Western Reserve; to tell of the legacy that the farmers of southwestern Ohio, through the establishment of Poland-China swine and the merchants of Cincinnati through the establishment of packing houses, bequeathed to the swine industry of America, nor is there time to do credit to the sheep breeders of eastern Ohio and western Pennsylvania. In 1850 nearly one-fifth of all the sheep raised in the United States were raised in Ohio.

In 1825 the national road was completed into eastern Ohio. In 1832 the Ohio and Erie canal had been built from Portsmouth to Cleveland. The first railroad was built in Ohio in 1836. In 1852 eight hundred and ninety miles of railroad were in operation. These agencies gave the Ohio farmer a market, and right well did he take advantage of it. It was the days of great prosperity for the Ohio farmer. The eastern farmer, on his relatively poor and high-priced land, suffered severely by this competition.

But silently as a thief in the night new factors arose to steal away the Ohio farmer's trade. The railroads had pushed their way into the fertile and treeless plains that for ages had lain ready for the plow. On these prairies countless herds could be pastured without cost for land. By 1850, the mower; by 1860, the reaper; by 1880, the self-binding harvester, made possible a development of the West, the like of which the world had never before seen. With it came millions of bushels of oats and corn, and millions of tons of hay and straw, which before they had any practical value must be turned into animal product. With the con-

solidation of the railroads in the great transcontinental lines, and with the establishment of steamboat navigation upon the lakes, the live stock industry of Ohio suffered from the same fierce competition of the West that the Eastern farmer had been suffering from his Ohio neighbor. The prostration would have been much more serious had it not been for the unparalleled local markets, which the farmers of Ohio enjoy. Those farmers, who realized the change in the situation and adjusted their business to meet it, however, in the last quarter of the century, have gotten along comfortably, and some have made considerable money, but with many who did not the story has been different. Such is the very brief and very inadequate sketch of the live stock industry of Ohio in the past. What of its future?

Every one knows, who is at all conversant with the live stock industry of this country, that the blood of the live stock man has again begun to boil. During the past year some of the old records in the way of prices have been smashed and new ones made; breeding cattle selling in four figures is again a common occurrence. In December, at Chicago, a carload of premium steers at public auction sold for fifteen dollars a hundred. The well-named steer, "Advance," champion at the International Live Stock Exposition, sold at public auction for one dollar and fifty cents per pound, or for two thousand one hundred and forty-five dollars. No one claims the steer was worth this money for beef, but it was in no sense a fictitious price. It is an indication of the times. It strikes me as very significant that men daily ship cream, and sometimes milk, through Columbus to be used in the retail trade of Pittsburg. A gentleman has recently been trying to establish a milk-condensing company in Columbus. He is a commission merchant from Philadelphia. He claims that he is interested in establishing a factory in order that he may have more condensed milk to sell in Philadelphia. If this be true (I do not assert it is true), it is very significant.

Is this only a boom? It certainly is a boom, and a boon as well to the live stock man. Is the boom going to burst? Let us get right close to this subject for a moment. Here is a chart that shows the number of domestic animals in the United States yearly for the past thirty years according to the estimates of the United States Department of Agriculture. With these figures I have connected the census returns for 1860. (Here the speaker traced the course taken by each class of domestic animals as shown on the chart.) It is here only necessary to recall that in 1870 the United States had not yet recovered from the effects of the most disastrous civil war of modern times. It would be intensely interesting to trace the progress of the live stock industry during the past thirty years. Time, however, forbids. I must ask you to take it in at a glance. This line (pointing to the population line) shows that the increase in population has been practically uniform since 1870. In order to compare this increase of population with the decrease of live stock, I have added the number of sheep and swine together and divided the sum by five. The result I have added to the numbers of horses, mules, milch cows and other cattle. The sum is what I call animal units. A glance at the upper line shows that the number of live stock began to increase sharply in 1875. From that year up to 1892 the live stock of the United States increased more rapidly than the population. Whatever the causes of this increase, it was made possible by the development of the vast country west of the Mississippi river, an area considerably over twice as large as that east of the Mississippi. Now observe what happened.

In 1892 we had the largest supply of live stock we have had in forty years. Now we have the least. Do you see it? Are you awake to what this means? Is it any wonder that the live stock man's blood boils? The comparatively slow increase from 1875 to 1892 and the rapid decrease in the past eight years are

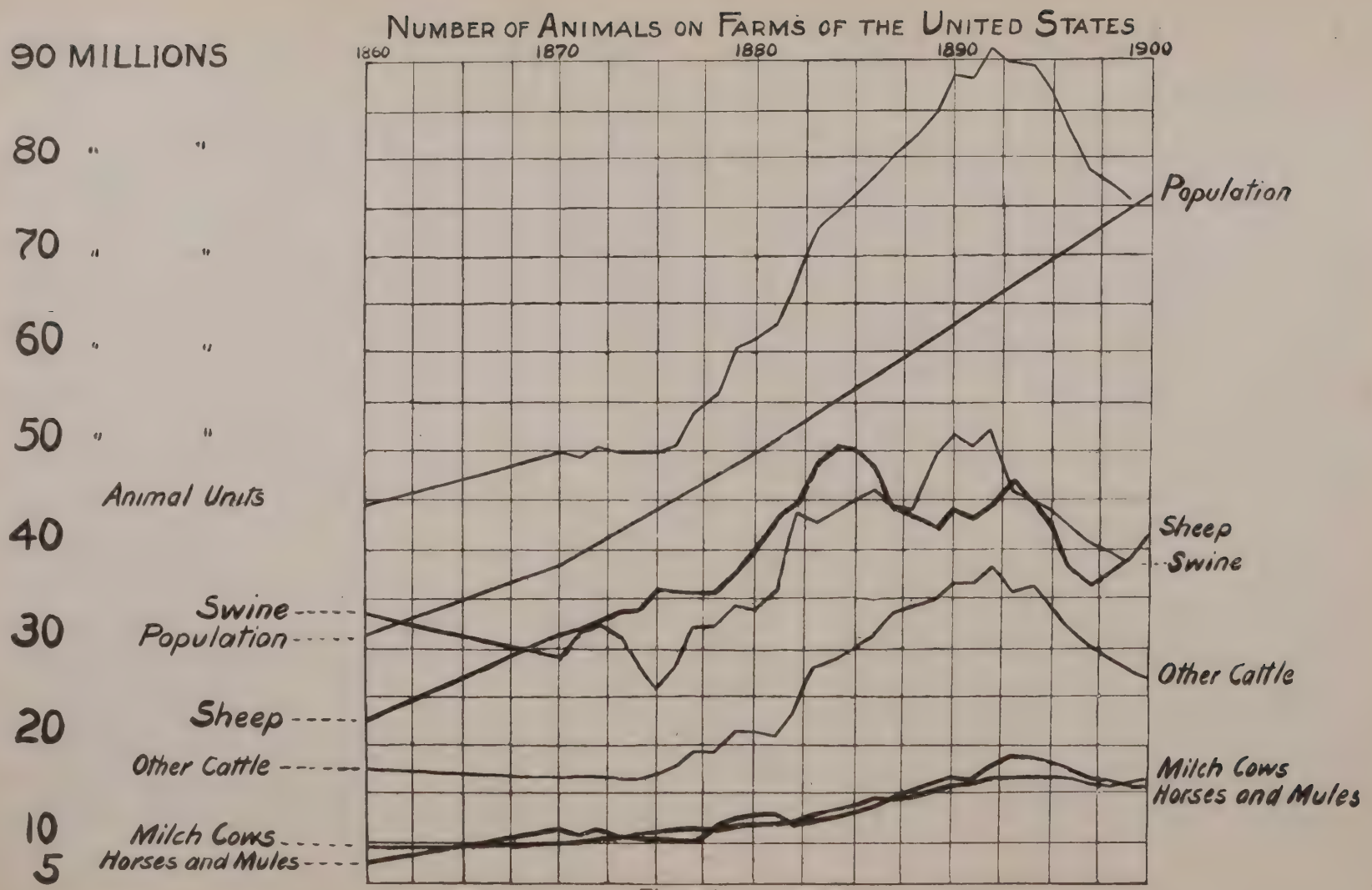
NUMBER OF ANIMALS ON FARMS OF THE UNITED STATES
1860
1870
1880
1890
1900
90 MILLIONS
80 " "
70 " "
60 " "
50 " "
Animal Units
40
30
20
10
5
Swine
Population
Sheep
Other Cattle
Milch Cows
Horses and Mules
Population
Sheep
Swine
Other Cattle
Milch Cows
Horses and Mules

Figure 1.

significant facts. Not only is the home demand increased by virtue of the increased population, but the foreign demand has been increased as well.

Here is an instructive table. It shows our exports of animals and animal products and of bread stuffs in millions of dollars for five-year periods:

	Animal Products.	Bread Stuffs.	Total.
1871-75	347	535	882
1876-80	620	848	1,468
1881-85	681	782	1,463
1886-90	616	698	1,214
1891-95	872	909	1,781
1896-00	1,012	1,210	2,222

I have purposely avoided values in this discussion, because values are often misleading. We are sometimes the richest in worldly goods when they are worth the least. It is no matter whether a given rib roast cost sixty cents or one dollar, it will serve the same number of guests. The animal values of the live stock of the United States during the past half of the century would not furnish a true guide for predicting the future. In like manner, the value of our exports is not an exact guide to our foreign trade. Export trade may be increased by the rise in prices abroad or a fall of prices at home. It is, however, impracticable to give the exports in quantities. I, therefore, give them in values with the caution indicated.

Comparing the first half of the "seventy" decade with the last half of the present decade, it will be seen that animals and animal products increased about three times, while bread stuffs increased less than two and one-half times. The export of bread stuffs tends to withdraw from domestic consumption products which either directly or indirectly would otherwise be used in producing animal products. It is worthy of notice here that the annual export of animals and animal products during the past five years has been eqaul to one-tenth the value of all animals to be found any January first upon the farms in the United States during the same period.

This is all very well, but I do not yet see where the Ohio man comes in. Do you? Of course, if the Ohio man is not in it somehow, this discussion is of no use or I have got an audience under false pretenses. It is obvious from what I have shown that there is a scarcity of animal products in the United States. Are we in danger of a meat famine? By no means. The demand will cause the supply to be created. Will meat products be again as cheap as before? In this revival of the live stock industry will the Ohio farmer suffer the same fierce, unequal competition that has been his lot during the past twenty-five years?

On Sunday, July 2, 1899, I stood on the bathing pavilion of Saltair in the great Salt Lake, gazing over the most desolate and dead country I had ever seen. It was Charles Dickens who said that there was nothing deader than a door nail, except a coffin nail, but Charles Dickens had never seen the Great Salt Lake and its surrounding territory I said to myself, I do not understand how any body of people, religious fanatics though they be, could ever have settled in such a desolate place. Imagine my surprise when I subsequently found it stated that formerly "more than one hundred thousand acres of land that were as inviting to look upon as possible were spread in plain view of all the people of Zion; deep soil of finest texture and of such fertility that the first crops were marvellous, were finally brought under systems of costly canals; villages with school houses, churches, stores and fine residences sprung up at close intervals, and there were more town sites located than there are buildings to show for them at the present time." Life and death go hand in hand. The life-giving water used to irrigate

gone or reduced, it is not surprising that the state should be decreasing in population.

Will this country, which has been so ruthlessly destroyed, be again made productive? I sincerely trust so. It is to the interests of the whole country that it should be. Already, as the result of the splendid researches of investigators, methods are being advocated to remove the deadly "alkali" which has been such a demon to irrigation. Men, who have given the subject the most careful study, believe that much of the arid ranges can by a proper system of husbandry be made productive again. I am not one of those who finds satisfaction in the misfortune of his neighbor. I believe that the general government should, if need be, do what it can by wise legislation to help this country to a new prosperity. I do not know whether any of the particular forms of legislation that have been proposed are wise or not, nor do I know what would be wise legislation, but I am sure that no selfish interests should be allowed to stand in the way of a judicious and helpful development of that great section. There must be in this country no north, no south, no east, no west. This is aside, however. It has been my purpose to trace some of the larger economic conditions so far as they relate to the live stock interests of this country. In order that we should understand the future it has been necessary for me to state the conditions as they exist.

We started in on the Atlantic seaboard over two hundred and fifty years ago to subdue the continent. In 1800 the United States territorially nowhere crossed the Mississippi river and nowhere touched the Gulf of Mexico, much less had our agriculture and civilization reached these limits. By 1850 we had acquired our present continental limits, Alaska excepted, but the great west and northwest was agriculturally an undiscovered country. In the past fifty years we have swept the continent with our agricultural operations. In 1875 central Iowa was yet a wilderness. This map shows how rapid was the live stock industry west of the Mississippi between 1875 and 1890 and how it has declined since that time. For two hundred and fifty years we have been able to practice a system of highway-robbery agriculture. The highwaymen's business was profitable while it lasted. During the first half of the century the Ohio valley states with their fresh lands sorely tried the eastern farmers. During the last half of the century the states west of Chicago have enjoyed an immense economic advantage and the Ohio valley farmers have in turn suffered from this competition. But we have now reached the Pacific coast. The old conditions seem to be forever gone. There are no longer cheap but valuable lands between Chicago and Denver. The cream has already been taken off of the lands west of Denver. There the live stock industry has already reached its highest pioneer development and has declined. It is not my purpose to prophesy, but it would now seem that we have come face to face with a new situation. The western farmer can no longer raise cattle so nearly free from cost. This is a situation that every thoughtful man has known would come sooner or later, but it has come upon us so suddenly as to be almost sensational. In the new era of live stock development, which is now so manifestly in progress, it would seem that the eastern farmer is no longer to wear the handicap which he has worn during the last half of the last century. The young man of Ohio with fifty years before him faces a different situation so far as the rearing of live stock is concerned than did his father fifty years ago. Live stock will, of course, be cheaper. The present demand will create a supply, which will bring prices down again, but in the competition that follows for a share of this trade the Ohio farmer now has a somewhat equal advantage, and in the way of local markets, a superior advantage. He is no longer to suffer from the fierce competition incident to the pioneer development of the West.

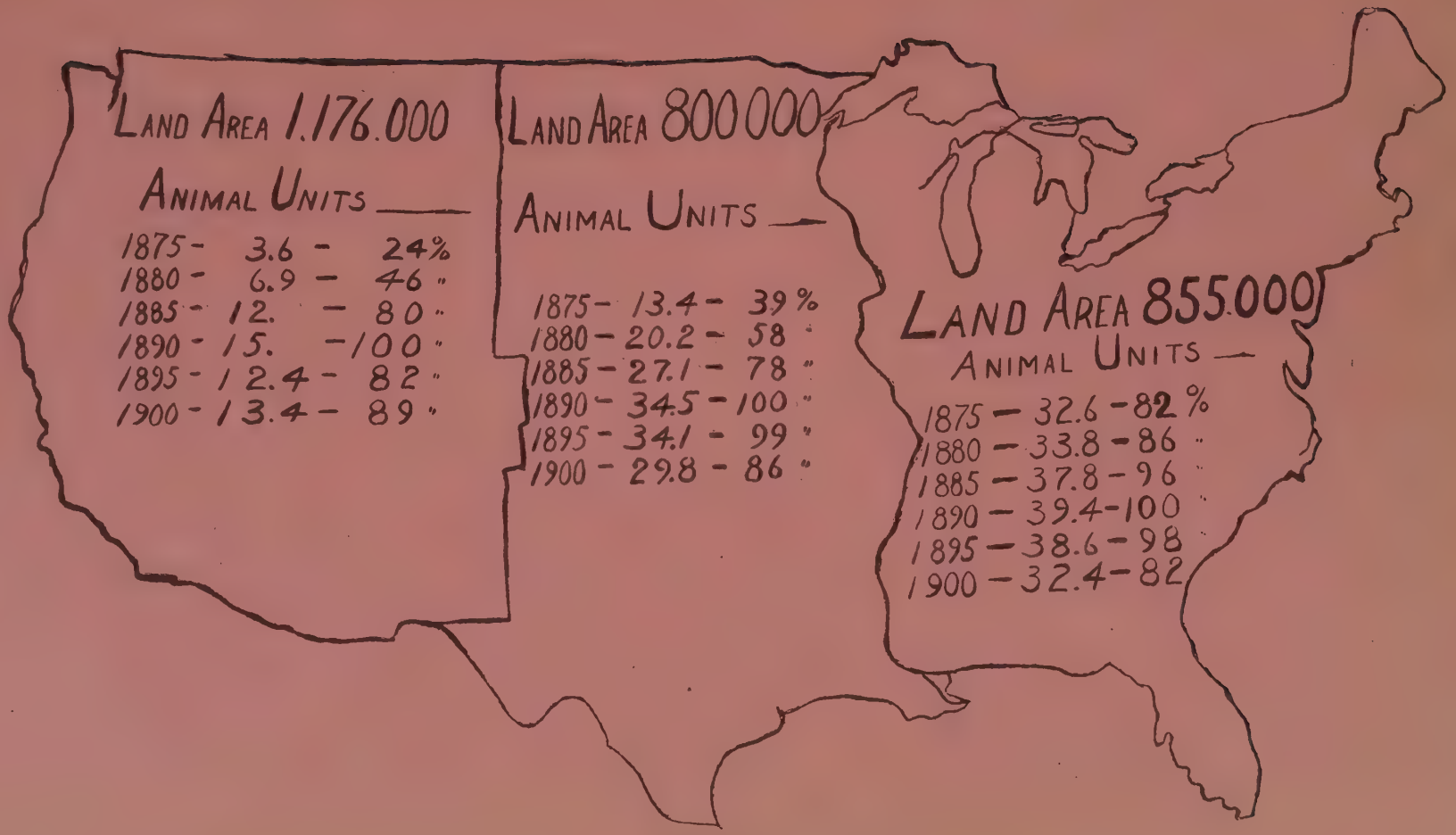
LAND AREA 1.176.000
ANIMAL UNITS
1875 - 3.6 - 24%
1880 - 6.9 - 46 "
1885 - 12. - 80 "
1890 - 15. - 100 "
1895 - 12.4 - 82 "
1900 - 13.4 - 89 "
LAND AREA 800 000
ANIMAL UNITS
1875 - 13.4 - 39 %
1880 - 20.2 - 58 "
1885 - 27.1 - 78 "
1890 - 34.5 - 100 "
1895 - 34.1 - 99 "
1900 - 29.8 - 86 "
LAND AREA 855.000
ANIMAL UNITS
1875 - 32.6 - 82 %
1880 - 33.8 - 86 "
1885 - 37.8 - 96 "
1890 - 39.4 - 100 "
1895 - 38.6 - 98 "
1900 - 32.4 - 82 "

Figure 2.

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THE CLASSIFICATION OF THE WAVERLY SERIES OF CENTRAL OHIO

By Charles S. Prosser

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THE CLASSIFICATION OF THE WAVERLY SERIES OF CENTRAL OHIO[1]

INTRODUCTION

PERHAPS it may seem strange that a consideration of the classification of the Waverly series[2] is proposed after the thorough investigations of the Ohio Geological Survey directed by Doctors Newberry and Orton. Their investigations gave the world the main facts concerning the economic and general geology of the state and the names of Newberry and Orton will be associated for all time with the geology of Ohio as those of Mather, Emmons, Vanuxem, and Hall are with that of New York, and Henry D. Rogers and Lesley with that of Pennsylvania. It is true of geology, however, as of other sciences that the scope is constantly widening so that a restatement of facts or, perhaps, another investigation of the whole subject, aided by later discoveries, may be required. At present this is especially true with reference to the stratigraphical geology of America. During the lifetime of Dr. Newberry the nomenclature of

[1] Published by permission of Professor Edward Orton, Jr., state geologist of Ohio. Presented to the tenth meeting of the Ohio State Academy of Science, Columbus, December 27, 1900.

[2] Series is used in the sense proposed by the International Congress of Geologists. See Work Inter. Cong. Geologists, 1886, p. 50; GILBERT, in Proc. A. A. A. S., Vol. XXXVI, 1888, p. 186; and Congrès Géologique International (8e Session), Procès-verbaux des Séances, 1901, p. 34.

geological formations was not closely scrutinized and there were very few clearly defined rules governing the naming of the various geological divisions. In general, the names referred to some locality in which the rocks were more or less favorably exposed. But this was not always the case, for not infrequently mineralogical or paleontological terms were used for the names of the divisions. Much the same system prevailed during the period of the more active investigations of Dr. Orton and it is only during the last few years that the movement has arisen to place the nomenclature of stratigraphical geology on a basis similar to that of the biological sciences. Two of the most potent influences in this movement are the International Congress of Geologists and the United States Geological Survey. The most important principles of nomenclature governing the United States Survey are: first, a formation is a lithological unit representing the physical conditions of deposition, and should be called by the same name so far as it can be traced and identified by means of its lithologic characters aided by its stratigraphic associations and its contained fossils. The formation shall receive a distinctive designation, the preferred form being binomial of which the first member is geographic and the other lithologic. When the formation, however, consists of beds differing in lithologic character, so that no single lithologic term is applicable, the word "formation" shall be substituted for the lithologic term. The second principle is the rule of priority.[1] These two principles of nomenclature have been very imperfectly observed in most of our stratigraphical geology and as recently as December 1899, Dr. J. M. Clarke, state paleontologist of New York, and Mr. Charles Schuchert published a revised classification of the formations of New York in which a number of time-honored names were replaced by new terms.[2]

REVIEW OF FORMER CLASSIFICATIONS

In 1838 Professor C. Briggs, Jr., the fourth assistant geologist of the first geological survey of Ohio, proposed the name

[1] Tenth Ann. Rept. U. S. Geol. Surv., 1890, pp. 64, 65.

[2] Science, N. S., Vol. X, 1899, pp. 874–878.

"Waverly sandstone series" for the rocks occurring between the "argillaceous slaty rock, or shale stratum," now known as the Ohio shale, and the "conglomerate" which lies at the base of the Coal-measures. Waverly is the name of the capital of Pike county in southern Ohio and Professor Briggs stated that "As some of the most beautiful stones that have been obtained were quarried at Waverly, we may, for the present, denominate these rocks the Waverly sandstone series."[1]

In the following report, for some reason, Professor Briggs used the term "fine-grained sandstone" in place of the Waverly in his descriptions of the geology of Hocking, Athens, and Crawford counties.[2]

In the first report of the Newberry survey, Dr. Newberry and Professor Andrews revived the name, "Waverly sandstone."[3] Professor Andrews stated that it consisted of "A group of sandstones and shales, measuring on the Ohio River 640 feet in thickness (from the black slate to the base of the sub-Carboniferous limestone in the Kentucky hills), [which] rests conformably upon the black slate."[4] He further described a stratum of bituminous black shale 16 feet in thickness, 137 feet above the base of the group to which he gave the name "Waverly black slate."[5] It was also stated that between the Coal-measures and Waverly in Hocking county was "a group of comparatively fine-grained, buff-colored sandstone," 133½ feet in thickness which was named the Logan sandstone."[6] Below the Logan sandstone was given 85 feet of rocks which were stated to be composed of fine-grained sandstones alternating with conglomerates and this

[1] First Ann. Rept. Geol. Surv. Ohio, p. 80.

[2] Second Ann. Rept. Geol. Surv. Ohio, 1839, pp. 122, 130. See also his section of the strata of Ohio, facing p. 109. The same term was used by Mr. Foster, another assistant; see pp. 76 and 103, and, facing p. 73, his "Geological section along the National road from the Scioto River to the eastern line of Muskingum county."

[3] Geol. Surv. Surv. Ohio, Pt. I, Rept. Progress in 1869, 1870, p. 21; Pt. II, p. 65.

[4] *Ibid.*, Pt. II, p. 65. [5] *Ibid.*, p. 66.

[6] *Ibid.*, p. 76. The "section on Hocking River" on the "map showing the Lower Coal Measures" at the close of this report gave the thickness of the Logan sandstone group as 144 feet.

division in some parts of the report is called the "Waverly conglomerate."[1] Professor Andrews identified these two divisions in the Licking Valley and stated that "at Black Hand, near the east line of Licking county, the conglomerate is probably fifty or sixty feet thick, and over it lies, as we follow the dip to the southeast toward Zanesville, the Logan sandstone group. The Logan sandstone, with its characteristic fossils, is found to extend to a point between Pleasant Valley and Dillon's Falls, on the Baltimore and Ohio Railroad."[2]

Dr. Newberry stated that the Waverly group, as it was then called, "In the northern part of the state . . . . is much less homogeneous [than in the southern part], and is composed of the following elements:

	Feet
Cuyahoga shale (dove-colored shale and fine blue sandstone)	150
Berea grit (drab sandstone)	50
Bedford shale (red and blue clay shale)	60
Cleveland shale (black bituminous shale)[3]	20–60."

This classification was repeated by Dr. Newberry in 1873 in his report on the geology of Cuyahoga county, with a revision of the thickness of the several divisions, as follows:

		Feet
Waverly group	Cuyahoga shale	150–200
	Berea grit	60
	Bedford shale	75
	Cleveland shale[4]	21–60

At a later date the Cleveland black shale was referred by Dr. Orton and some other geologists to the Devonian system. The same classification for the Waverly was given by Dr. Newberry in 1874 under his description of the Carboniferous system.[5] In this volume Professor N. H. Winchell reported numerous outcrops of the Berea grit succeeded by the Cuyahoga shales and

[1] See p. 135 and explanation of the "section on Hocking River" on the "map showing the Lower Coal Measures."

[2] *Ibid.*, p. 79. Also see *ibid.*, Rept. Progress in 1870 [1871], p. 59.

[3] *Ibid.*, Pt. I, Rept. Progress in 1869, p. 21.

[4] Rept. Geol. Surv. Ohio, Vol. I, Pt. I, p. 184.

[5] *Ibid.*, Vol. II, Pt. I, p. 87.

sandstones in northern central Ohio in Crawford, Morrow, and Delaware counties.[1] This identification of Professor Winchell's is important because it carried correctly, for the first time, the Berea grit with the overlying Cuyahoga shale from northern Ohio to the central part of the state. Dr. Orton published the descriptions of the geology of Pike and Ross counties in this volume, and gave the following subdivisions of the Waverly series:

At the base are from 80 to 100 feet of the *Waverly shales*,[2] a name apparently proposed by him. This was followed by what he termed the *Waverly Quarry System*, with a thickness of 32½ feet, one mile south of Jasper.[3] Immediately above the sandstone is a black shale, from 16 to 27 feet in thickness, which, Dr. Orton stated, had been "designated by the chief geologist the '*Cleveland shale*' and by Professor Andrews the '*Waverly black slate;*'"[4] while the remaining part of the series, including everything "above the Waverly black slate and below the Carboniferous series" was denominated the Upper Waverly, composed of shales and sandstones with a maximum thickness not exceeding 425 feet.[5]

Meek in 1875, in giving the horizon of *Discina* (*Orbiculoidea*) *Newberryi* Hall, stated that certain specimens came "from the Berea shale, a member of the Waverly group of the Lower Carboniferous,"[6] which is, apparently, the first usage of the name in a stratigraphical sense, although it does not clearly appear that Meek intended to separate the shale from the subjacent Berea grit.

In 1878 Dr. Orton's "Report on the geology of Franklin county" was published, and in it occurs a description of the Waverly group as far as represented in the county. The Huron shale, the youngest formation of the Devonian system, was described as closing with "a red or chocolate-colored band, from

[1] *Ibid.*, pp. 240, 259, and 280.

[2] *Ibid.*, p. 619. [3] *Ibid.*, p. 621. [4] *Ibid.*, p. 624. [5] *Ibid.*, p. 649.

[6] Rept. Geol. Surv. Ohio, Vol. II, Pt. II, Palæontology, p. 278. See also statements in explanation of Plate XIV.

15 to 20 feet in thickness." Outcrops of these red shales were mentioned as occurring at "Taylor's Station, in Jefferson township, and at several points in Mifflin township, on the eastern bank of Big Walnut Creek. One exposure in particular may be named, which is very conspicuous, viz., the one seen in the slate cliff, opposite Central College."[1]

Dr. Orton's correlation of the divisions of the Waverly was as follows:

		Feet
Waverly group of the sub-Carboniferous period	Cleveland shale	15
	Waverly quarry system	60
	Waverly shales[2]	10–20

In the report above mentioned Dr. Orton said "the Cleveland shale of Dr. Newberry, the Waverly black shale of Professor Andrews . . . . is known at but a single locality in the county, viz., at Ealy's Mills, in Jefferson township, on the banks of Rocky Fork. From 10 to 15 feet of this formation are here shown within the compass of an acre."[3] Dr. Orton further stated that Professor Winchell was in error in correlating the sandstone at Sunbury, Delaware county, with the Berea grit, his statement being as follows: "The Sunbury stone is erroneously referred in Vol. I [Vol. II] to a higher division of the Waverly, viz., the Berea grit, but it certainly belongs to the lowest of the sandstone courses of this formation."[4] The same volume contains the "Report on the Geology of Licking County," by M. C. Read, who described therein the upper Waverly of that county. The oldest division noted by Read was the *Waverly conglomerate*, which was said to be "conspicuously exposed along the south bank of the Licking in Madison and Hanover townships, presenting abrupt, precipitous bluffs 20 to 40 feet high."[5] The conglomerate was succeeded by the "olive shales," which were said to occupy "an interval of 150 to 190 feet below the Carboniferous conglomerate,"[6] and were described as composed mainly of shales, but with some "strata of massive sandstone."

[1] Rept. Geol. Surv. Ohio, Vol. III, Pt. I, p. 638.
[2] *Ibid.*, p. 639.
[3] *Ibid.*, p. 642.
[4] *Ibid.*, p. 642.
[5] *Ibid.*, p. 360.
[6] *Ibid.*, p. 359.

In July 1878 Professor L. E. Hicks, of Denison University, announced "the discovery [of] an unmistakable outcrop of Cleveland shale [which] exists two miles east of Sunbury in Delaware county, southern [central] Ohio, on the land of Horace Whitney. It lies *above* the calcareous sandrock of the Sunbury quarries, which Professor N. H. Winchell, a special assistant of the Ohio geological survey, identified as *Berea grit.* My discovery *demonstrates* the incorrectness of that identification, and raises a strong presumption, amounting almost to a certainty, that he was equally wrong in respect to his Berea grit in Morrow and Crawford counties."[1] Professor Hicks made no reference to the classification of the Waverly and identification of the Cleveland shale in Franklin county by Dr. Orton, and on the other hand Dr. Orton did not mention Professor Hicks' papers in any of his publications so I am unable to state which article has priority. The September number of the same periodical contained a classification of the Waverly group in central Ohio by Professor Hicks, which was stated to include the rocks lying between the Huron shales and the base of the Coal-measures. The classification is as follows:

	Feet thick
5. Licking shales	100–150
4. Black Hand conglomerate and Granville beds	85–90
3. Raccoon shales	300
2. Sunbury black slate	10–15
1. Sunbury calciferous sandrock[2]	90–100

The following year Dr. Orton published a "Note on the Lower Waverly Strata of Ohio" in which for the first time the Waverly black shale of southern Ohio was correctly correlated with the black shale directly above the Berea grit in northern Ohio for which the name Berea shale was proposed. This furnished the key for the correct correlation, between northern and southern Ohio, of the lower formations of the Waverly series, which was summarized in the following table:

[1] Am. Jour. Sci., and Arts, 3d ser., Vol. XVI, p. 71.

[2] *Ibid.*, p. 216.

Northern Ohio	Southern Ohio
Cuyahoga shale - - 150–250 ft. Upper beds fossiliferous	Shale and sandstone - 300–400 ft. Upper beds fossiliferous
(Berea shale) - - - 10 ft. Included by Newberry with Cuyahoga	Waverly black shale - - 15 ft.
Berea grit - - - - 60 ft.	Waverly quarries and overlying blue shale - - - - 60 ft.
Bedford shale - - - 75 ft.	Waverly shale - - - 90 ft.
Cleveland shale	Great black shale [1]

In 1888 Dr. Orton published a general classification of the Waverly group which he considered as composed of the Bedford shale, the Berea grit, the Berea shale, the Cuyahoga shale, and the Logan group. The Cuyahoga shale, however, was restricted to the shales and fine-grained sandstones between the Berea shale and the base of the conglomerate and sandstone forming the upper part of the Waverly. This upper division was called the Logan group which was said to consist of the Waverly conglomerate and Logan sandstone of Andrews as found in Hocking, Fairfield, and Licking counties. To the north the olive shales of Read in Knox and Richland counties were correlated with the Logan sandstone.[2] The same classification was republished by Dr. Orton in his last report for the Ohio survey.[3]

In 1888 Professor C. L. Herrick, who had studied the paleontology and stratigraphy of the Waverly series of central Ohio more thoroughly than any of the former observers, published his conclusions. Professor Herrick had also studied the Waverly of northern and southern Ohio and rocks of similar age in Pennsylvania and western New York, so that his classification was not intended to be confined to the rocks of central

[1] *Ibid.*, Vol. XVIII, p. 139.

[2] Rept. Geol. Surv., Ohio, Vol. VI, pp. 33–42.

[3] *Ibid.*, Vol. VII, 1893 [1895], pp. 26–35.

Ohio. The upper part of the series he correlated with the formations of the Mississippi valley and two quite persistent conglomerate horizons were named Conglomerate I and II.[1]

The classification is as follows:

Cuyahoga or Waverly series
- Logan — Keokuk, 100–150 ft. / Burlington
- (Conglomerate II)
- Kinderhook, 50–60 ft.
- (Conglomerate I)

Berea or Transition series (Western equivalent of Upper Chemung)
- Waverly shale, 40 ft.
- Berea shale, 200–400 ft.
- Berea grit, 50–60 ft.
- Bedford shale, 50 ft.
- Cleveland shale (local), 50 ft.

Erie shale,
Eastern or typical Chemung (lower part), 100 ft.[2]

In the above classification the Berea shale included Dr. Orton's Berea shale and all of his overlying Cuyahoga shale except its fossiliferous upper 40 feet which, extending to the base of Conglomerate I, was called the Waverly shale.

In 1889 Dr. Newberry stated that the Waverly group "where best seen, as in northeastern Ohio, ... is about 500 feet thick, and fills the interval between the Erie shale (Chemung) below and the Carboniferous conglomerate above."[3] The following classification of the Waverly group was given:

	Average thickness feet
1. Cuyahoga shale	230
2. Berea shale	20
3. Berea grit	60
4. Bedford shale	75
5. Cleveland shale[4]	50

[1] Bull. Sci. Lab., Denison University, April 1888, Vol. III, p. 24; see also section on p. 26.

[2] *Ibid.*, December 1888, Vol. IV, pp. 105, 106. The zones of these formations with their characteristic fossils and thickness are given in detail on pp. 99–101.

[3] Mon. U. S. Geol. Surv., Vol. XVI. The Paleozoic Fishes of North America, p. 120.

[4] Loc. cit.

It will be noticed that Dr. Newberry accepted the separation of the Berea shale from the Cauyhoga shale ; but did not accept the reference of the Cleveland shale to the Ohio shale. This point he discussed quite fully and stated that the union of the Cleveland, Erie, and Huron shales to form the Ohio shale seemed unwarranted.[1] Dr. Newberry referred to Professor Hicks, announcement of the discovery of the Cleveland shale in Delaware county, saying in conclusion: "I think he has found there the Berea shale, which lies immediately above the Berea grit."[2]

In 1891 Professor Herrick reviewed the general stratigraphy of the Waverly series, commencing with the Bedford shale. The lower boundary of the Waverly, however, he thought "must be found in the Berea grit, which . . . . is a sharply limited and easily recognizable horizon throughout Ohio."[3] The Berea grit came next, followed by the Berea shale, which, he states, is a term "conveniently applied to the thin band of bituminous shale above the grit, and perhaps should not be extended (as the writer has done in a previous paper) to the gray and blue shales above."[4] For the overlying rocks he used the name Cuyahoga shale in the sense in which it was used by Dr. Orton, except that the upper 40 feet, as in the previous paper, was called the Waverly shale. This division was stated to be stratigraphically continuous with the Cuyahoga shale which it also resembled lithologically, but paleontologically it more closely resembled the succeeding division or Kinderhook. The last division was called the Burlington and Keokuk.

REVISED CLASSIFICATION

This concludes the review of all the important papers published concerning the classification of the Waverly series of central Ohio. As a result of this study followed by an examination of the formations in the field, the writer proposes the following classification for the Waverly series of central Ohio.

[1] *Ibid.*, p. 128.
[2] *Ibid.*, p. 129.
[3] Bull. Geol. Soc. Amer., Vol. II, p. 35.
[4] *Ibid.*, p. 35.

No attempt is made, however, to correlate the formations with those of the sub-Carboniferous of other states:

	Feet
6. Logan formation (Andrews)	115
5. Black Hand formation (Hicks)	40–(120?)
4. Cuyahoga formation (Newberry)	275–300
3. Sunbury shale (Hicks)	10–15
2. Berea grit (Newberry)	40
1. Bedford shale (Newberry)	85+

Bedford shale was named by Newberry in 1870[1] from the outcrops at Bedford, southeast of Cleveland, at which place, he later states, the best exposure occurs.[2] The term "Bedford rock" appears in Richard Owen's description of the geology of Lawrence county, Indiana, published in 1862;[3] but it was not used as the name of a geological division. This interpretation is apparently confirmed in the subsection of the report devoted to the general description of the sub-Carboniferous limestone where the term "Middle or Lawrence—Crawford sub-Carboniferous limestone"[4] is proposed, a name evidently employed to denote a geological division. Mr. E. R. Cumings, of Indiana University, informs me that the Bedford oölitic limestone belongs in this division.[5] Writers since Owen have used the terms "Bedford stone," "Bedford oölitic stone," and other names for the rock, which was finally excellently described in 1896 by Hopkins and Siebenthal under the formation name of the "Bedford oölitic limestone."[6] It is the opinion of the writer, however, that the term "Bedford shale" used by Dr. Newberry as the name of a formation in 1870 is the one that should stand and the Indiana formation name of Bedford oölitic limestone should be dropped. Since the above was written Mr. E. R. Cumings has proposed the name, Salem limestone, for the Bedford oölitic limestone of Indiana.[7]

[1] Geol. Surv. Ohio, Pt. I, 1870, p. 21.

[2] Rept. Geol. Surv. Ohio, Vol. I, Pt. I, 1873, p. 189.

[3] Rept. Geological Reconnoissance of Indiana during 1859 and 1860, p. 137.

[4] *Ibid.*, p. 125. [5] Letter, January 13, 1901.

[6] Twenty-first Ann. Rept. Ind., Dept. Geol. and Nat. Resources, pp. 291, 298.

[7] Am. Geol., Vol. XXVII, March 1901, p. 147.

This formation succeeds the Ohio shale, and as the Cleveland and Erie shales are supposed not to extend to central Ohio it probably rests on the Huron shale in Franklin county. The lower part of the formation in this county is well shown on the eastern bank of Big Walnut Creek east of Central College where the following section occurs:

		Thickness feet	Total thickness feet
No. 7.	Till and soil	5	87½
6.	Fine green argillaceous shale. *Bedford shale*	7	82½
5.	Mixed chocolate and greenish shale, mostly olive color	7½	75½
4.	Chocolate shale composed of fine clay	21⅔	68
3.	Fine green to olive argillaceous shales. Near base blocky shales containing fossils. *Base of Bedford*	17⅓	46⅓
2.	Fine black shales containing small concretions. *Huron shale*	24½	29
1.	Covered to level of Big Walnut Creek	4½	4½

The greater part of the formation is shown on Rocky Fork, commencing about one and a half miles east of Gahanna and continuing up the creek for a mile. About one fourth mile up the creek from the ford on the north and south road is an outcrop, on the southern bank, of three feet of black shale which is nearly at the top of the Huron shale. A short distance farther up the creek is a higher bank which gives the following section:

		Thickness feet	Total thickness feet
No. 3.	Till	6½	28¾
2.	Fine chocolate shales of the Bedford	7	22⅓
1.	*Bedford shales.* The upper part is somewhat sandy but the grains are very fine, and the lower part is composed of greenish to bluish argillaceous shale. Creek level	15⅓	15⅓

At the second bluff to the west of the private bridge is the following section:

		Thickness feet	Total thickness feet
No. 2.	Till	7⅔	36
1.	Chocolate argillaceous shale which weathers to a red clay. *Bedford shale.* Creek level	28⅓	28⅓

To the east of the bridge the base of the till is much lower than on the western side and there is a marked line of unconformity between the till and Bedford shale. Two hundred and twenty-five feet east of the above section is the following, which shows an irregular surface on which the till was deposited:

	Thickness feet	Total thickness feet
No. 2. Till with beds of sand - - - - -	49⅓	54
1. Bedford chocolate shale. Creek level - -	4⅔	4⅔

The covered interval between this bank and the next one is extensive enough to hide the top of the chocolate shale and the bluff is composed of grayish shales of the upper Bedford capped by the Berea sandstone. The following section is shown on the western bank of the creek below a tree:

	Thickness feet	Total thickness feet
No. 4. Till - - - - - - - - -	5	56½
3. Grayish sandstone layers about one foot thick. *Berea sandstone* - - - - - -	14	51½
2. Sandy, fine-grained shales with argillaceous ones above and below - - - - -	9¾	37½
1. At the top a sandy concretionary layer 2 ± feet thick. Shales mostly grayish and argillaceous. In the lower part are spots of reddish-gray shale somewhat similar to the mottled shale No. 5 east of Central College. Level of creek	27¾	27¾

The Bedford shale includes the red band from 15 to 20 feet in thickness, which Dr. Orton, in his report on Franklin county, considered the upper part of the Huron shale;[1] the gray shale between the red and black Huron shales which was not mentioned in the county report; and the Waverly shales.[2]

2. *Berea grit* was named by Dr. Newberry in 1870, from the large quarries at Berea, southwest of Cleveland.[3] It is well shown on Rocky Fork, to the north of the outcrops of the Bedford shale and on the banks of Big Walnut Creek about one mile northeast of Sunbury, Delaware county. There are beautiful examples of ripple marks in the sandstone at both of these localities. On the eastern bank of Rocky Fork is an exposure of 31½

[1] *Ibid.*, Vol. III, Pt. I, p. 638. [2] *Ibid.*, p. 639. [3] Geol Surv. Ohio, Pt. I, p. 21.

feet of gray, thin bedded Berea sandstone, some of the layers a foot or more in thickness, with some partings of clay shale below which are 8 feet of bluish Bedford shales partly argillaceous and partly arenaceous, while in the upper part are thin layers of sandstone. The thickness of the Berea sandstone on this creek is about 40 feet and in the upper part at the highway is a small quarry. On the western bank of the Big Walnut between the railroad and highway bridges, one mile northeast of Sunbury, there is from 26 to 30 feet of it shown in the vertical cliff. This formation is called the "Waverly quarry system" in the report on Franklin county,[1] and the "Sunbury Calciferous sandrock" by Professor Hicks.[2]

3. *Sunbury shale* was named by Professor Hicks in 1878, from outcrops on Rattlesnake Creek on the present farm of Amos Whitney, about two miles east of Sunbury. North of the Whitney house there is an outcrop of 3½ feet of this black shale on the northern bank of the creek, and it may be seen at irregular intervals for some distance down the stream. A single specimen of a *Lingula* was the only fossil found, but the lower part of the shale is concealed and the top of the Berea grit crosses the creek a little below the house of Mr. W. P. Swallow. There is a much better exposure on Rocky Fork, in Franklin county, where the contact of the shale and Berea is shown just above the highway bridge on the David Meyers farm. The lower 2 feet of the very fossiliferous shale is exposed, containing abundant specimens of *Lingula melie* Hall, and *Orbiculoidea Newberryi* Hall, together with fragments of fish bones and teeth. Farther up the creek 8 + feet of the shale is shown on the western bank resting on the Berea grit.

This shale was first inappropriately named the "Waverly black slate" by Andrews in 1870[3] because the term Waverly had already been used for the larger division which includes this shale. Geological nomenclature is being revised for the purpose of eliminating and preventing the duplication of geographic

[1] *Ibid.*, Vol. III, p. 639. [2] Am. Jour. Sci., 3d ser., Vol. XVI, p. 216.

[3] Geol. Surv. Ohio, Pt. II, 1870, p. 66.

names of stratigraphic divisions of the same or different rank. The name Berea shale, proposed by Dr. Orton in 1879,[1] is excluded, first, by the law of priority, since Sunbury shale was published and defined by Professor Hicks the preceding year, and second, because Berea had been used in 1870 by Dr. Newberry for the name of a formation. The division termed the Cleveland shales in the report on Franklin county is the Sunbury shale.[2]

4. *Cuyahoga formation* (shale) was the name given by Dr. Newberry in 1870[3] to "the uppermost member of the Waverly group" and was described as crossing Cuyahoga county and forming the banks of the Cuyahoga River to the Cuyahoga Falls.[4] Originally the Sunbury shale constituted the lower part of this formation, and in 1888 Dr. Orton separated the coarser deposits of conglomerate and sandstone in the upper part of the Waverly, as found in central and southern Ohio, from this formation, under the name of the Logan group,[5] and said this "upper member of the series [Waverly] is wanting in the Cuyahoga Valley, or is at least very inadequately represented there."[6]

Professor Herrick in 1891 from paleontological and stratigraphical evidence showed that this upper part of the Waverly is wanting in northern Ohio, and said: "We can positively assert that the Cuyahoga shale as represented in the northern tier of counties is identical with that part of the Waverly lying below Conglomerate I . . . . of central Ohio. The fossiliferous horizons of Granville, Newark, Rushville, and Winchell's Division 4, on the Ohio River, are all above the top of the Cuyahoga."[7]

Finally, Professor Herrick stated in 1893 that in the "northern localities the calcareous, concretionary layer, which has yielded so abundant a fauna in central Ohio, was discovered at

[1] Am. Jour. Sci., 3d ser., Vol. XVIII, p. 138.

[2] Loc. cit., pp. 639, 642. [4] Rept. Geol. Surv. Ohio, Vol. I, Pt. I, p. 185.

[3] Geol. Surv. Ohio, Pt. I, p. 21. [5] *Ibid.*, pp. 37, 39. [6] *Ibid.*, p. 39.

[7] Bull. Geol. Soc. America, Vol. II, p. 37. See also the section of Cuyahoga Valley and Bedford, on p. 40, where it is stated that "This entire series [upper part of the Waverly] is absent in the northern tier of counties to the base of Conglomerate I."

a distance of 40 feet beneath the Coal Measure conglomerate and most of the characteristic species re-collected. This served to settle the question conclusively except for the few feet above this horizon."[1]

The present writer considers the Cuyahoga shales of central Ohio as composed of the shales and sandstones occurring between the top of the black Sunbury shale and the base of the coarse deposit called by Professor Herrick Conglomerate I. In this formation, therefore, is included the 40 feet of fossiliferous shales immediately underlying Conglomerate I of Professor Herrick which he called the Waverly shale.[2] Should a separation of this shale from the Cuyahoga prove necessary it would require a different name, because Waverly had already been used—first, as the name of a series; second, as the name of the conglomerate in central and southern Ohio; third, as the name of the black shale in southern Ohio; fourth, as the name of the sandstone in the vicinity of Waverly; and fifth, the identical term Waverly shale by Dr. Orton for the lowest division of the series in southern Ohio.[3]

This formation was called the Raccoon shales by Professor Hicks, who said: "It appears in force all along Raccoon Creek and its tributaries, and extends westward into Franklin and Delaware counties."[4] Its thickness was estimated by Professor Hicks as 300 feet, while Professor Herrick stated that "the Cuyahoga proper is never more than 200 feet thick."[5]

In central Ohio the Cuyahoga formation is composed largely of bluish to grayish shales and buff sandstones which are fairly well exposed on Moot's Run and other streams in the western and central parts of Licking county.

[1] Rept. Geol. Surv. Ohio, Vol. VII, 1893, pp. 502, 503.

[2] Bull. Denison Univ., Vol. IV, 1888, p. 107.

[3] Rept. Geol. Surv., Ohio, Vol. II, Pt. I, 1874, pp. 619, 648; and Figs. 1 and 2 of the report on Pike county.

[4] Am. Jour. Sci., 3d ser., Vol. XVI, 1878, p. 219.

[5] Bull. Geol. Soc. Amer., Vol. II, 1891, p. 38.

5. *Black Hand formation* (conglomerate) is the name given by Professor Hicks in 1878 to the deposits of coarse sandstone and conglomerate exposed at Black Hand in the gorge of the Licking River and about Hanover.[1] Both of these localities are in Hanover township, in the eastern part of Licking county. We find, as in the case of most conglomerates, that when this formation is followed for some distance there are quite decided differences in the lithologic character of the rocks. In the vicinity of Newark and Granville they are mainly sandstones, with some layers of shales and two comparatively thin strata of conglomerates. Professor Hicks states that these beds are well exposed at Granville and are only a local modification of the Black Hand conglomerate, and for convenience he designated them "the Granville beds."[2] Professor Andrews in 1870 called this division the Waverly conglomerate;[3] but this name was preoccupied, because Waverly had already been used for the name of the series. He correlated the conglomerate at Black Hand with that of the Waverly and gave its thickness at that locality as probably 50 or 60 feet.[4]

At Havens' quarries, on the farm of Mr. G. W. Havens, one and one half miles southeast of the central part of Newark, is a good exposure of the sandstone phase of this formation. The section begins in the conglomerate stratum on the bank of Quarry Creek below the quarries, where an excavation has been made in prospecting for gold, and continues to the top of the bank above the quarry on the eastern side of the run. The quarry on the western side of the creek is shown in Fig. 1, the lower part of which is in the Black Hand and the upper the Logan formation.

[1] Amer. Jour. Sci., 3d ser., Vol. XVI, pp. 216, 217.

[2] *Ibid.*, p. 218.

[3] Geol. Surv. Ohio, Pt. II, p. 135, and on the explanation of the "Section on Hocking River" of the "Map showing the Lower Coal Measures."

[4] *Ibid.*, p. 79.

FIG. 1.—Havens quarry on the western bank of the stream. The lower part shows the massive sandstone of the Black Hand formation, the top of which is Herrick's Conglomerate II, indicated by the two upper students. Succeeding Conglomerate II the lower part of the Logan formation is shown.

SECTION AT HAVENS' QUARRY

		Thickness feet	Total thickness feet
No. 9.	Till and soil - - - - - - - -	2	75
8.	Alternating shales and sandstone - - -	14½	73
7.	Massive buff sandstone splitting into many layers - - - - - - - - -	16	58½
6.	Bluish argillaceous shales - - - - -	4½	42½
5.	Conglomerate stratum No. II of Herrick; average thickness 11 inches - - - - - -	1	38
4.	Bluish fossiliferous shales containing numerous specimens of *Spirophyton* and other fossils; was called the "Allorisma layer" by Herrick - -	6½	37
3.	Grit containing a few fossils - - - - -	½	30½
2.	Light gray to buff fine-grained sandstone, which is called freestone and quarried. This forms a massive zone which splits into several layers. The upper 8 feet of this zone is shown in this quarry, and, at the base in the gold-mine opening, nearly 3 feet of drab argillaceous shale, below which is 3¼ feet of coarse-grained buff sandstone. In the Havens quarry, on the western side of the creek, nearly 20 feet of this sandstone is shown, and in the Vogelmeier quarry, one and one half miles south of Newark, 27 feet of sandstone, separated by a 5-inch bluish shaly layer 9 feet below the top. In certain layers of this sandstone fossils are common, especially *Syringothyris cuspidatus* (Martin).		
1.	Conglomerate stratum, 3 feet thick. Sandstone parting, 7 inches. Massive conglomerate with quite large pebbles, which are coarser than in the upper layer. Level of creek (Conglomerate No. I of Herrick) - - - - - - -	5	5

From the freestone No. II of the above section the following species were collected:

1. *Syringothyris cuspidatus* (Martin) (c).
2. *Spirifer Winchelli* Herrick.
3. *Crenipecten Winchelli* (Meek) (c).
4. *Platyceras Hertzeri* Winch (r).
5. *Chonetes pulchella* Winch (rr).
6. *Rhipidomella* (*Orthis*), cf. *Michelina* L'Eveillé (c).

7. *Cryptonella eudora* Hall (rr).
8. *Camarotœchia marshallensis* (A. Winch) ? (rr)

The Allorisma shales No. IV contain the following species:

1. *Allorisma ventricosa* Meek (rr).
2. *Sanguinolites* (?) *obliquus* Meek (r).
3. *Sanguinolites œolus* Meek (r).
4. *Sanguinolites* sp.
5. *Camarotœchia marshallensis* (Win.) (?) or *C. Cooperi* Shum. (?)
6. *Allorisma Winchelli* Meek (c).
7. *Sanguinolites naiadiformis* Winch. (r).
8. *Prothyris Meeki* (Winch) (r).
9. *Spirophyton* cf. *crassum* Hall (c).
10. *Syringothyris cuspidatus* (Martin) (rr).
11. *Liopteria* sp. (rr).
12. *Discina* (*Orbiculoidea*) *pleurites* (Meek) (?) (rr).

Professor Andrews did not definitely indicate the boundaries of the Waverly conglomerate; neither did Professor Hicks those of the Black Hand conglomerate and Granville beds. The thickness of the conglomerate near Hanover was given as from 85 to 90 feet,[1] and that of the Granville beds as from probably 25 to 111 feet.[2]

The Fucoid layer (No. 4c) of Hicks' Granville beds is the same as the "Allorisma layer" of Professor Herrick's and No. 4 of the Havens section. Division No. 2 of Professor Herrick's, which he called the Middle Waverly or Kinderhook, was clearly defined by Conglomerate No. I at the base and Conglomerate No. II at the top,[3] and by its fossils correlated with the Kinderhook formation of the Mississippi valley. This formation is apparently quite well marked by these two conglomerate strata in the vicinity of Newark, and Professor Herrick identified Conglomerate II in sections from Ashland county to Sciotoville on the Ohio River,[4] and later states that the Allorisma shale is "very persistent and well limited, even when the Conglomerate (No.

[1] Am. Jour. Sci., 3d ser., Vol. XVI, p. 217.

[2] *Ibid.*, p. 218. The statement is not clear, and 85 feet possibly represents the minimum thickness.

[3] Bull. Denison Univ., Vol. IV, 1888, pp. 105, 106.

[4] *Ibid.* See sections on p. 102.

VOGELMEIER QUARRY, NEWARK, OHIO.

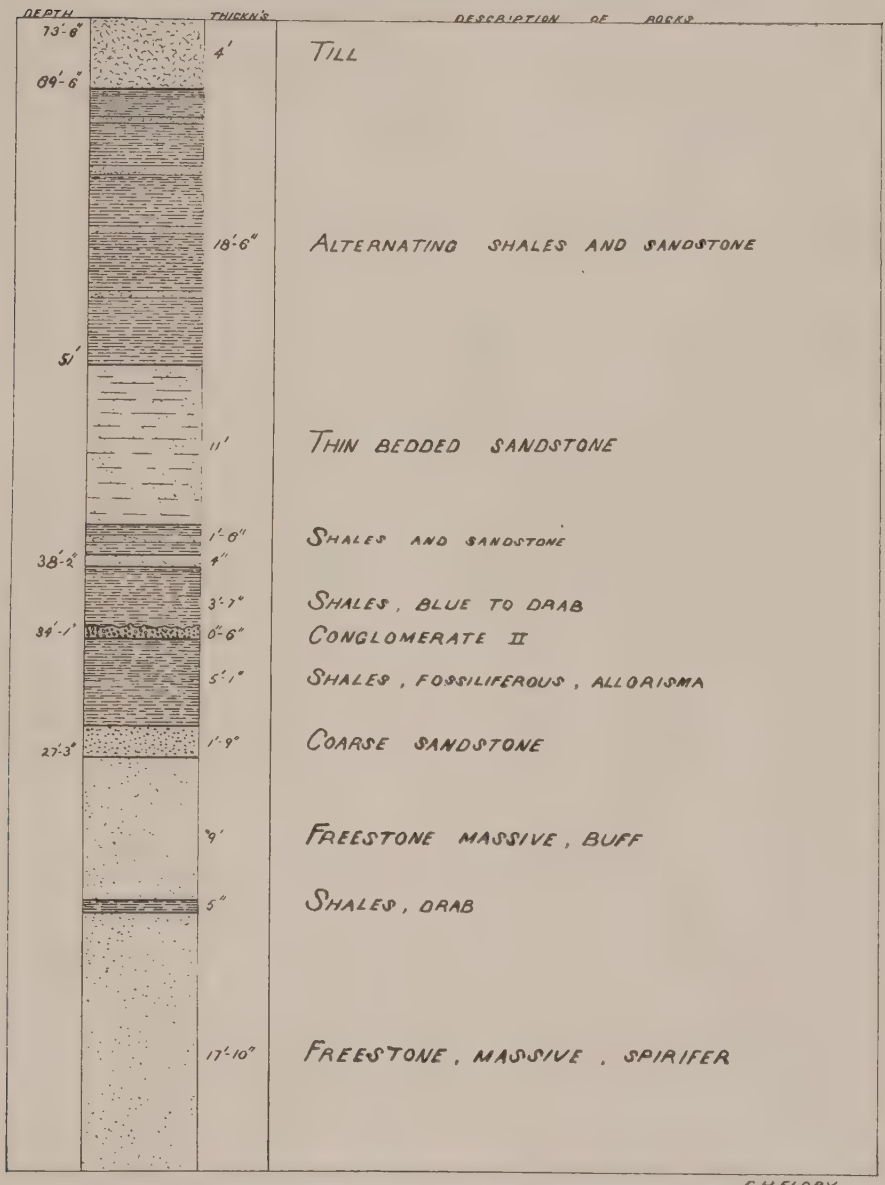


FIG. 2.—Section of Vogelmeier quarry, southeast of Newark, showing a part of the Black Hand and Logan formations. Conglomerate II is considered the line of division between them.

II) is absent, having been traced from Sciotoville to the northern exposures in Wayne county."[1] Conglomerate No. I seems less persistent than No. II, but below the freestone there are generally thick shales, so that the base of the formation is quite distinct stratigraphically.

In the vicinity of Hanover and in the gorge of the Licking River at Black Hand are excellent exposures of the conglomerate phase of the formation. Below Hanover, on the western

FIG. 3.—Ledge of Black Hand conglomerate below Hanover.

side of Rocky Fork, is a fine cliff of the conglomerate 80 feet high, which is shown in Fig. 3, while apparently its top, as shown by partial exposures in the field above the brow of the cliff, is some 35 feet higher. Professor Hicks gave the thickness of the Black Hand conglomerate at Hanover as from 85 to 90 feet,[2] and Professor Herrick reported that in the region about Clay Lick station, in Hanover township, "is a great development of the conglomeratic phase of the Waverly. One half mile east of Clay Lick there is a nearly continuous exposure of about 100 feet of alternating conglomerate and coarse sandstone of prevailingly red color."[3]

[1] Bull. Geol. Soc. America, Vol. II, 1891, p. 38.

[2] Am. Jour. Sci., 3d ser., Vol. XVI, 1878, p. 217.

[3] Bull. Sci. Lab. Denison Univ., Vol. II, 1887, p, 15.

To the east of the Hanover railroad station is a cut in which the contact of the Black Hand conglomerate and overlying Logan sandstone is nicely shown. To the south of the cut and highway is the quarry of the Hanover Pressed Brick Co. in the shales of the Logan formation. The section from the railroad to the top of the quarry is as follows:

		Thickness feet	Total thickness feet
No. 4.	Mainly blue to drab argillaceous shales with some bands of sandstones which vary from 7 inches to perhaps a foot in thickness -	20	92
3.	Covered - - - - - - - - -	18	72
2.	Buff shaly thin bedded sandstones containing fossils which are well shown in the upper part of the railroad cut in the vicinity of the highway bridge. Lower part of the *Logan sandstone* which is separated by quite a sharp line from the massive grit to conglomerate below. There are some thin layers of conglomerate near the base of the Logan sandstone.	22	54
1.	Massive grit to conglomerate which forms the lower portion of the cut. Part of the rock is a buff grit and the remainder a conglomerate some of the pebbles of which are quite large.	32	32

BLACK HAND CONGLOMERATE

The Black Hand conglomerate named from the cliffs in the gorge of the Licking River, known as the Licking Narrows, begins a short distance above the station of Black Hand on the Baltimore and Ohio Railroad.[1] On the north side of the river rather more than a quarter of a mile above the bridge are two conspicuous cliffs, the lower one called Red Rock and the upper one Black Hand which is shown in Fig. 4. On the southern side of the river is a railroad cut which shows finely the contact of the Black Hand conglomerate and the Logan sandstone. To the west of the cut at a distance of about one half mile from the station is a prominent cliff in one part of which is the E. H.

[1] For a description of the topography of this region and the former as well as the present gorge of Licking River, see Professor W. G. Tight's paper in Bull. Sci. Lab., Denison Univ., Vol. VIII, Pt. II, pp. 36–43, and Pls. I, II.

Everetts & Co. quarry for glass sand. The following section was measured at this locality from the level of Licking River to the top of the cliff.

SECTION OF SOUTHERN BANK OF LICKING RIVER AT EVERTTS & CO. QUARRY

		Thickness feet	Total thickness feet
No. 6.	Till - - - - - - - - -	7	101
5.	Thin, irregular bedded, drab or bluish sandstone and bluish argillaceous shales. In places at the bottom is a 3-inch clay shale resting on the massive conglomerate with a sandstone to conglomerate layer above. Lower part of the *Logan sandstone* - -	22	94
4.	A coarse conglomerate stratum at the top of the conglomerate which in places is 11 inches thick. The top of the *Black Hand conglomerate* - - - - - - - - -	1	72
3.	Gray to drab coarse grit, which in places is a conglomerate that is worked for glass sand. This forms the upper part of the main cliff -	21	71
2.	Coarse grit and conglomerate to the base of the cliff at the Crusher - - - - -	16	50
1.	Mostly covered bank below the Crusher but all in the conglomerate as shown by exposures a little farther down the river. Level of Licking River - - - - - - -	34	34

6. *Logan formation* (sandstone) was named by Professor Andrews in 1870 from outcrops in Hocking county near Logan,[1] and was stated to overlie the conglomerate at Black Hand and to extend down the Licking Valley "to a point between Pleasant Valley and Dillons Falls."[2] This division was named the Licking shales by Professor Hicks, who states that they are well developed in the hills bordering Licking River from Newark to Black Hand, 100 to 150 feet in thickness, and "lie 70 to 80 feet above the water level, forming the middle of the slope of these hills, the base being composed of the massive Black Hand conglomerate and the upper slopes and summit of the various strata of the Coal

[1] Geol. Surv. Ohio, Part II, pp. 76, 79. [2] *Ibid.*, p. 79.

Measures."[1] This formation is Division 3, or the Upper Waverly of Professor Herrick, which he gave as 80 feet in thickness in Licking county and which, from the fossils, he correlated with the Burlington and Keokuk of the Mississippi valley.[2]

In 1888 Dr. Orton united the Waverly conglomerate and Logan sandstone of Andrews to form the Logan group.[3] If it

FIG. 4—Black Hand rock in the gorge of Licking River.

be advisable to make one formation of these two divisions, the above name is inappropriate because the Logan sandstone of Professor Andrews clearly referred to the upper division only, as has been noted by Professor Herrick.[4]

The above ruling is believed to represent the position of the United States Geological Survey, as shown by the following quotation from a recent letter of Mr. Bailey Willis, assistant in

[1] Am. Jour. Sci., 3d ser., Vol. XVI, 1878, p. 216.

[2] Bull. Denison Univ., Vol. IV, 1888, pp, 99, 100.

[3] Rept. Geol. Surv., Ohio, Vol. VI, p. 39.

[4] Bull. Geol. Soc. Amer., Vol. II, 1891, p. 38.

geology to the Director of the United States Survey and Geologist in charge of Areal Geology, to whom these questions in nomenclature are referred:

The survey distinctly recognizes the right of priority, that is to say, the name first applied to a well defined geologic unit is to be preferred. The qualifying conditions, on account of which the name may be rejected and one of later application used, are (1) that the name has been previously applied to some other unit, and (2) that the unit to which the name was applied was not well defined.

Thus, in the case which you cite, the term Waverly conglomerate (Andrews) would not hold if Waverly had previously been used for something else, and by application of the same rule Waverly series should be discarded if Waverly conglomerate had priority. The Logan group (Orton) should not stand as opposed to Logan sandstone.

In these questions there is often a personal element which makes it a matter of regret that some desirable name should not be adopted, but we feel that the advantages of clearness and definition in science must be superior to such conditions, and that the rule should be rigidly applied.[1]

Dr. George H. Girty, of the United States Geological Survey, who has been engaged for several years in a thorough study of the stratigraphy and paleontology of the Waverly series in Ohio, Michigan, and Pennsylvania, concurs in regarding the upper part of the series in central Ohio as composed of two formations, as may be seen from the following quotation:

I have seen the Logan group at Logan and vicinity and also at various points in Licking county. I quite concur with you in regard to the separateness of the two component members in central Ohio at least, and am in uncertainty as to the reasons which led Professor Orton to unite the two beds under a common name.[2]

The lower part of this formation is well shown in the Vogelmeier and Havens quarries, where Conglomorate II is succeeded by from 4½ to 6 feet of greenish-gray to bluish argillaceous shales, and these are followed by from 11 to 17 feet of quite massive buff sandstones, capped by alternating shales and sandstones, 18½ feet of which are shown at the top of the Vogelmeier quarry. There are fair exposures of the remaining part of the formation in "the gorge" to the east of the Havens quarry,

[1] Letter of December 18, 1900. [2] Letter of January 5, 1901.

partly in the bank of the creek and partly by the roadside, where 85 feet of buff arenaceous shales to thin bedded sandstones are shown. This gives about 115 feet for the thickness of the formation, which is capped by the Coal-measure conglomerate where the road and creek emerge from the woods. In sections farther to the south and southeast the top of the Logan sandstone is defined by the base of the sub-Carboniferous limestone, named by Professor Andrews the Maxville limestone.

CHARLES S. PROSSER.

COLUMBUS, OHIO,
December, 1900.

University Bulletin **Series 5, Number 17**

(**Botanical Series, No. 7**
Edited by W. A. Kellerman)

MOSSES; ILLUSTRATIVE SAMPLES.

W. A. Kellerman.

The samples on the accompanying attached sheet are intended to illustrate the kind of material to be collected, and the method of labelling and mounting the specimens, for the Herbarium. It will be noticed that most of the specimens are in "fruit," which is the popular name for the "capsule" that terminates the "se-ta," or slender stem. A delicate cap called the "ca-lyp-tra," may usually be seen, completely or partially covering the capsule before it is fully mature. The terminal portion of the capsule, called lid or "o-per-cu-lum," often drops off when maturity is reached; in this manner the "spores" or microscopical non-sexual reproductive bodies produced within, are allowed to escape. The mouth or opening of the spore case (capsule) is surrounded by a row of slender teeth, called collectively the "per-i-stome;" this may be clearly seen with the aid of a lens after the ripe operculum is removed. The accompanying diagrammatic figures illustrate the parts just mentioned.

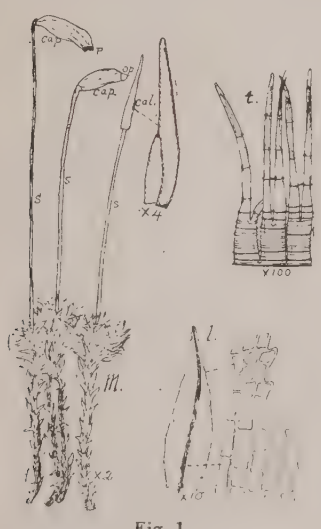


Fig. 1.

The life history, or cycle of development, of our common Mosses may be briefly sketched as follows: When the spores germinate a slender branching tube, or alga-like filament, appears which has been designated the "pro-to-ne-ma." This contains chlorophyll; it grows in moist protected places, and here and there develops root-like threads, called "rhi-zoids," which anchor it to the soil. "Gem-mae" or buds also appear on the protonema and these develop into the upright clustered stems that bear the leaf-like structures. At the apex of the "ac-ro-car-pous" mosses, and from the sides in "pleu-ro-car-pous" species, there are formed the organs for sexual reproduction, namely, "an-ther-id-i-a" and "arche-go-ni-a;" these are surrounded by a cluster of leaf-like bracts, called

Fig. 1.—A common Moss (M) bearing fruit (*s* and *cap.*); one capsule is old, one fresh, one immature and covered by the calyptra (*cal.*); the teeth (*t*) of the peristome (*p*), and a leaf (*l*), magnified, are also shown.

the "per-i-che-ti-um" or perichetial scales. This structure, consisting of the delicate reproductive bodies and their conspicuous and surrounding protecting organs, has been called the "flower" of the mosses.

The microscopic bodies produced in the antheridia (and called "sper-mat-o-zoids"), and that produced in the archegonia (and called the "o-o-sphere"), are designated by the term "gam-etes;" it is their union that constitutes "fertilization." It can now be understood why this stage of the development of the moss plant, as outlined in the preceding paragraph, is designated by the term "gam-e-to-phyte;" it is the plant (or generation) that produces the gametes. It is in popular language the "moss" plant.

The fusion of the two gametes results in the production of the sexual spore, called the "o-o-spore;" it develops at once into the second

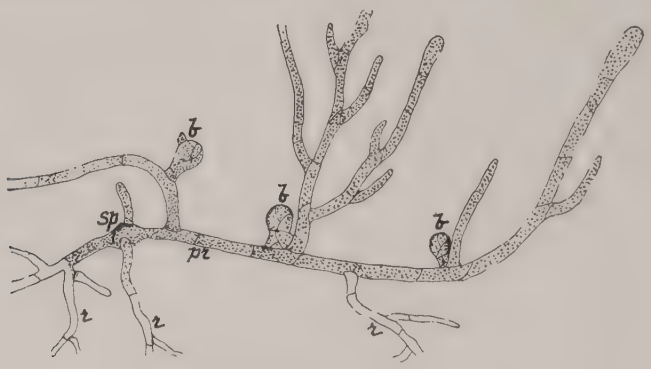


Fig. 2.

generation, or second stage in the life-cycle of the moss plant, which is called the "spo-ro-phyte." It consists of the seta and capsule; the lower end ("foot") of the seta becomes early embedded and fixed in the tissue of the gametophyte, and from it is derived the nourishment necessary to complete the development of the sporophyte, or the plant that produces the numerous non-sexual spores. This "alternation of generations,"—that is, the alternation of gametophyte and sporophyte, —is not peculiar to Mosses, but occurs also in the Pter-id-o-phytes and Sper-mat-o-phytes.

CLASSIFICATION OF THE VEGETABLE KINGDOM.

I. Thal-lo-phytes; as the Slime-moulds, Bacteria, Common Algae (green Pond-scum, etc.), Marine Algae ("Sea-moss"), Moulds, Mildews, Smuts, Rusts, Mushrooms, Toadstools, Puffballs, etc.

II. Bry-o-phytes; The Mosses and Liverworts.

III. Pter-id-o-phytes; The Ferns, Club-mosses and Horsetails.

IV. Sper-mat-o-phytes; The Gymnosperms (Pines, etc.) and Angiosperms (Monocotyls and Dicotyls).

FIG. 2.—The growth or protonema (*pr*,) from the spore (*Sp.*), having rhizoids (*r*), and buds (*b*) from which stems develop.

BOTANICAL DEPARTMENT,

Ohio State University.

W. A. KELLERMAN, Ph. D., Professor. J. H. SCHAFFNER, A. M., M. S., Assistant Professor.

Sample Herbarium Specimens of Mosses.

Those wishing the sample specimens should accompany the request with a nickel or two 2-cent postage stamps, to pay in part the expense of preparing the specimens and postage.

ORDERS OF MOSSES.

1. Sphag-na-les; the Bog-mosses or Sphagnum.
2. An-dre-æ-a-les; one genus of small Mosses in mountain regions.
3. Ar-chid-i-a-les; only one very short-stemmed species.
4. Bry-a-les; the common Mosses occurring in Ohio.

The only book that could be used by beginners in identifying Mosses, is Grout's "Mosses with a Hand-lens," price $1.10; procure if wanted from the author, or if placed in our hands the order will be attended to. The Manual by Lesquereux and James could be used by advanced students.

It is earnestly requested that contributions of Mosses for the STATE HERBARIUM from every County in Ohio be made. Please send an ample amount of each kind, enclosed in a temporary paper pocket or envelope; with each specimen lay a slip of paper or temporary label, giving *locality, date and collector's name*, also any notes that are made with reference to habitat or habit of the plants. The donor's name and other data will be placed on the permanent label accompanying the herbarium specimens.

The issues in this (Botanical) Series are as follows:

No. 1. Fourth State Catalogue of Ohio Plants, by W. A. Kellerman, (University Bulletins, Series 4, No. 10, April, 1899.)

No. 2. General Methods in Botanical Microtechnique, by John H. Schaffner, (University Bulletins, Series 4, No. 13, June, 1899.)

No. 3. The Nutation of Helianthus, by John H. Schaffner, (University Bulletin, Series 4, No. 26, April, 1900.

No. 4. The Non-Indigenous Flora of Ohio, by W. A. and Mrs. Kellerman, (University Bulletin, Series 4, No. 27, April, 1900.)

No. 5. First Annual Supplement to the Fourth State Catalogue of Ohio Plants, by W. A. Kellerman, (University Bulletin, Series 4, No. 28, April, 1900.)

No. 6. Preliminary List of the Edible Fungi of Ohio, by Elma Brooks Perry, (University Bulletin, Series 4, No. 30, May, 1900.)

No. 7. Mosses, Illustrative Samples, by W. A. Kellerman, (University Bulletin, Series 5, No. 17, April, 1901.)

Copies of Nos. 4, 5, 6 and 7 are yet obtainable; a few copies of No. 1 remain but they have been bound, and a charge of 20 cents is made to cover cost of binding and postage.

University Bulletin, Series 5. Number 18. May, 1901.

Ohio State University Dairy School

MAKING SWISS CHEESE.

JANUARY 2 TO MARCH 15, 1902.

COLUMBUS, O.

PUBLISHED BY THE UNIVERSITY.

Entered at the P. O. at Columbus, O., as second-class matter.

Dairy Class of 1901.

Pasteurizing and Bottling Laboratory.

THE OHIO STATE UNIVERSITY is divided into six colleges as follows:

The College of Agriculture and Domestic Science;
The College of Arts, Philosophy and Science;
The College of Engineering;
The College of Law;
The College of Pharmacy; and
The College of Veterinary Medicine.

The College of Agriculture and Domestic Science offers six distinct courses of study:

1. *A four years' course in Agriculture.*
2. *A four years' course in Horticulture and Forestry.*
3. *A four years' course in Domestic Science.*
4. *A two years' course in Horticulture and Forestry.*
5. *A two years' course in Domestic Science.*
6. *A one term course in Dairying.*

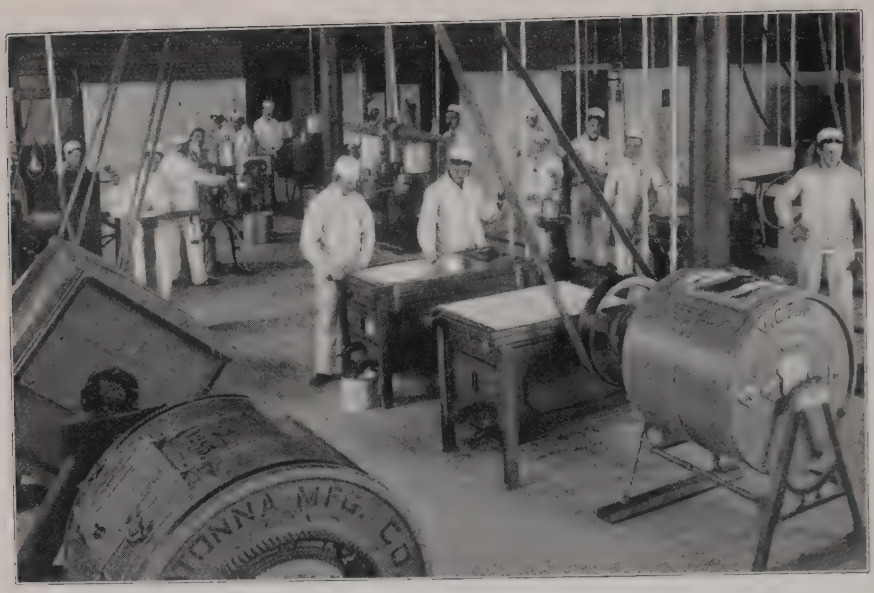
Illustrated bulletins of any of the above colleges or courses will be sent upon application to the President, Ohio State University, Columbus, Ohio.

DAIRYING AS A PROFESSION.

Ten or fifteen years ago, cheese and butter making was taught "by rule of thumb," but the attention of scientists has been turned to this interesting field of work, and a long list of men in our experiment stations have raised the business to the dignity of a profession, and guess work has given place to accurate knowledge. The investigations that have been made, and the inventions that have been perfected in recent years make a thoroughly scientific knowledge of dairying necessary to the highest success, and for this reason the need and demand for trained dairymen are constantly increasing.

Extent of the Dairy Business in Ohio.

In the State of Ohio are eight hundred thousand milch cows estimated at an average value of $31.00. This means an investment of $25,000,000 in milch cows alone, and if the farms and equipments where these cows are kept, and the cheese and butter factories are taken into consideration, it will be found that at least $500,000,000 is invested in the dairy business in this state. By the proper selection of these cows and by feeding and handling, the annual returns from these animals can be increased by several millions of dollars. Much unnecessary loss in quality also occurs in the manufacture of the milk into butter, cheese and bottled products, which might be saved by more intelligent methods of operation. A loss of one-tenth of a per cent of butter fat in a factory receiving ten thousand pounds of milk per day



Creamery Laboratory.

Combined Churn and Butter Worker.

means 4258 pounds of butter in a year, and this at the average of 20 cents per pound amounts to $851.60, enough to pay a butter maker's wages.

THE COURSE IN DAIRYING.

This course in dairying is designed to give butter makers, cheese makers, milk dealers and milk producers, who do not have the time nor opportunity to take the longer courses in Agriculture as thorough a training in the best methods employed in dairying as can be given in so short a time as ten weeks. Those wishing a more extended course can take the longer courses in Agriculture and specialize in dairying.

When the Term Opens.

The next term will open Thursday, January 2, 1902, and close on Saturday, March 15.

For Whom Intended.

Factory Operators. Butter and cheese makers who have learned their trade in the factory need a scientific knowledge of the constitution of milk, and the methods of testing milk and its products, and such makers become much more efficient in their work after taking this course, often saving the price of their wages. It is desirable that students who expect to become butter and cheese makers should first have some experience in a factory as they are then better fitted to take up the work given in the school.

Dairy Farmers. Farmers and stockmen who sell milk to dealers or to factory operators can often save the cost of attending themselves or of sending their sons to the school, in a year by understanding how to improve the herd, by compounding proper rations at the least cost, and by a knowledge of how to produce better milk. In addition to practical work in the bottling department, and with the farm dairy machinery, this class of students are given work with factory machinery that they may have intelligent ideas of factory requirements.

EQUIPMENT.

Townshend Hall.

Townshend Hall, the new agricultural building, has been erected and equipped at a cost of about $100,000. It is 260 feet long, varies in width from 64 to 78 feet, and is three stories in height. The dairy laboratories are on the ground floor and occupy 6000 square feet of floor space, and in addition to this space are the locker, toilet and bathrooms, stock judging room, reading room, and four lecture rooms, used by the Dairy students. The dairy laboratories are as spacious, as finely finished, and as well supplied with machinery as any dairy school in the country.

Creamery Room.

The large creamery room is equipped with nine hand power, three steam turbine, and three belt power cream separators—thus enabling the student to learn the construction and methods of operating these different styles of machines. Included in this equipment is a continuous pasteurizer such as is used in creamery operations. There are two combined churns and butter workers beside the ordinary box churn and Mason worker, and in addition

FARM DAIRY PRACTICE.

ASSEMBLING SEPARATORS.

to these, numerous farm dairy styles of churns, workers, and butter printers. A number of steam turbine and hand power Babcock milk testers are supplied for ascertaining the amount of butter fat in milk and tracing it through the different stages in the process of manufacture.

Pasteurizing Room.

The milk bottling and pasteurizing room has, like the other dairy laboratory rooms, tile floor and enameled brick wainscoting. It is equipped with a belt power separator, two styles of pasteurizers, milk bottling apparatus, and a steam sterilizing oven. The milk and cream trade in the large cities of this and adjacent states is growing and the school is often called upon to furnish men to take charge of milk bottling establishments.

Power House and Engineering Laboratory.

The factory operator should have intelligent ideas of the steam boiler and engine. The University has a large cenrtal Power House, but for the training of dairy students a special steam power plant adjoins Townshend Hall, and is equipped with boiler, pumps, inspirator, two steam engines, and an ammonia refrigerating machine for cooling the refrigerators and cheese curing room. Beside this, the engineering laboratory furnishes facilities for the inspection of numerous steam and gas engines, pumps, engineering instruments, and a very complete assortment of engineering supplies.

Cheese Making Laboratories.

The cheese making laboratory is a spacious room equipped with one large and four small size vats, three cheese presses, curd tests, rennet tests, milk testers, etc., and the necessary apparatus for making brick and Edam cheese. Just across the hall (shown in diagram, page 10) are two fine curing rooms furnished with apparatus for determining the humidity of the atmosphere and for supplying moisture to the air when a deficiency is noted.

Bacteriological Laboratory.

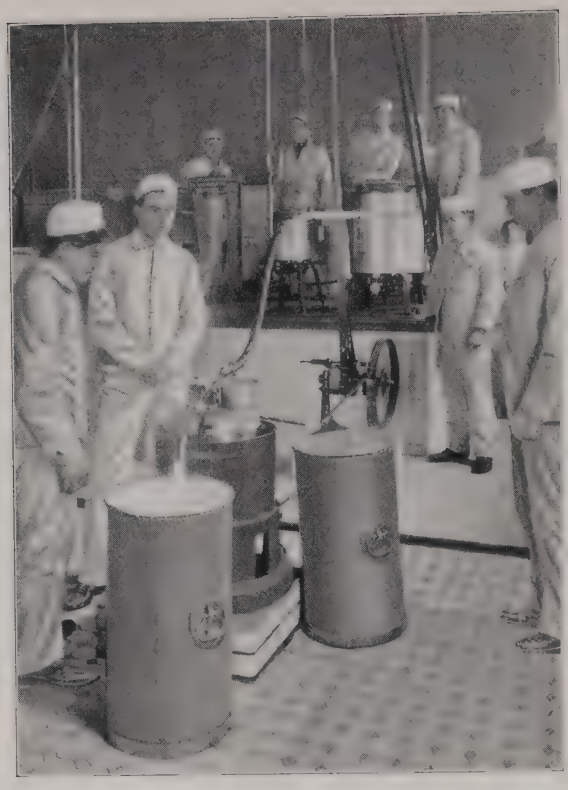
In the bacteriological laboratory, Biological Hall, are found facilities for the study of bacteria in water, milk, butter, and cheese, the equipment including compound microscopes, incubators, sterilizers, and, in short, all necessary apparatus commonly found in a bacteriological laboratory.

Live Stock Judging Room.

The live stock judging room is well lighted by natural and electric light. On one side are seats for the students, arranged in tiers so that the work before them can be easily observed. Double scales and other apparatus are provided for weighing and measuring the animals which are brought in before the class for demonstration. Large blackboards enable the instructor to place before the class weights and measurements, and milk records of cows exhibited.

Stereopticon.

One of the four lecture rooms is provided with an electric lighted stereopticon, by means of which, typical animals, cheese and butter factories, and apparatus used in different localities and countries, etc., can be shown. The



OPERATING REID PASTEURIZER AND CREAM SEPARATOR.

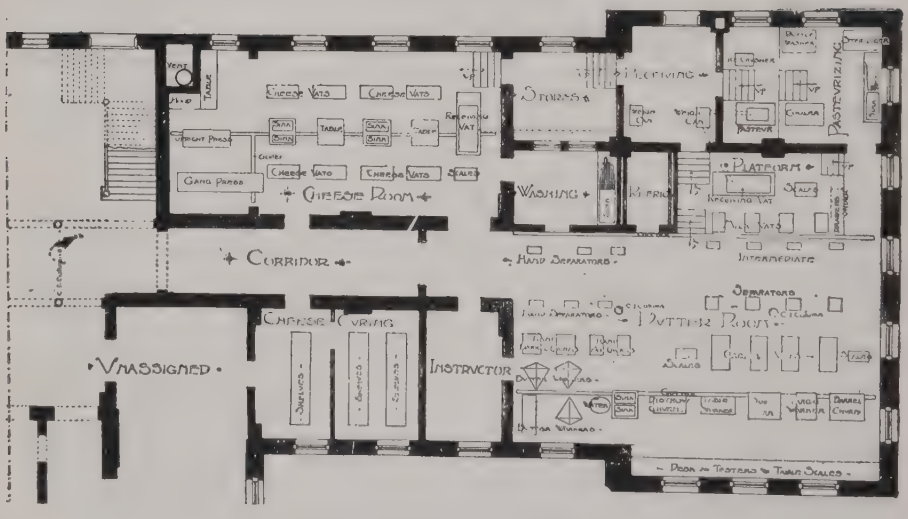


DIAGRAM OF DAIRY LABORATORIES.

stereopticon proves a valuable aid to the work in the laboratories and stock judging room.

WORK OF THE SCHOOL.

The work in the dairy laboratories begins at eight o'clock in the morning and lasts until the assigned work is completed or until two o'clock. From two to five in the afternoon, the students are occupied with lectures and quizzes as hereafter described. It will be seen that the student will need all of his spare time to work over his notes and fix firmly in his mind the work covered in the recitation room and laboratory. The ten weeks' course is crowded full of work from start to finish.

The students will meet Professor Decker twice a week for lectures on the constitution of milk and the manufacture of butter, cheese, and bottled products. He will have general charge of the laboratory and assign students to their places in the several rooms. He will be assisted in the laboratory by Mr. Burt B. Herrick, Instructor in Cheesemaking, and other instructors not yet named at the separators, in buttermaking, at the boiler and engine, and in the Pasteurizing room. The past term Messrs. Herbert Gibson, S. D. Postle, C. W. Bauman, Lewis Ladrach, Arthur McClellan and D. C. Holt, advanced students in dairying, assisted in the laboratory work. Others will be appointed for this work the coming term.

Cheesemaking.

In the cheese room, the student will be instructed to select milk for cheesemaking, using the rennet and acid tests for determining the proper ripeness, and the Wisconsin curd test for locating gassy or bad flavored milk. Cheddar-cheese making will be taught after the most approved methods, including use of the hot iron test, milling, salting, pressing, bandaging, and curing. Brick cheese is taking with much favor in this state and its manufacture will be carefully taught. Swiss cheese makers will be taught the cause of nissler and glassler cheese and how to control the formation of eyes. Edam cheese making will also receive attention. Students are required to report each day's work in this department on one of six blanks.

Work at the Cream Separators.

Students will be required to take apart and assemble the different cream separators, operate them carefully and efficiently, and at the end of the term write an essay on the construction and operation of the cream separator. A set of four blanks covers the work on the separators and the student is required to report his work accurately each day.

Churning and Butter Working.

The student is required to ripen the cream properly, churn it exhaustively, and work it so as to produce a proper grain. From the worker, he is required to put it into marketable packages in the neatest and most expeditious manner. Four blanks cover the work here described, and the student is required to report on the one which covers his work for the day. Students are given frequent demonstrations in scoring and grading butter

Cheese Making Laboratory.

Pressing the Cheese.

and cheese so that they may recognize the market standards and have a knowledge of how to make an article that will suit the demand.

Boiler and Engine, and Milk Bottling.

The work in the boiler and engine room and bottling plant has been partially described. A student is given one week's work in each place.

Milk Testing.

The work in testing milk, butter, cheese, skim milk, buttermilk and whey is of the greatest importance and the student is trained to operate the Babcock test and the lactometer correctly and to calculate the kind and amount of adulterations. He is also taught to test composite samples as is done in factories. It is important that the bottles and glass measures should be correct and instruction is given in the calibration of glassware. Daily reports are made on several different kinds of blanks. This work is given twice a week under the direction of Professor Weber.

COURSES OF LECTURES.

Courses of lectures in addition to the above described work are given as follows:

DAIRY FARMING.

PROFESSOR HUNT

Under this subject there are lectures upon the history, adaptation, care and management of different breeds of dairy cattle. By means of the score card with the animals before them, the students are taught to judge animals for dairy purposes. There are lectures on the principles of breeding and the student is required to trace and expand pedigrees and to understand the methods of recording animals as practiced by different breeders' associations. There are lectures upon the character of food stuffs, the relation of the food to the animal, and the kind and quantity of food for the best milk production. The students are required to calculate digestibilities and nutritive ratios of different foods and to arrange therefrom proper feeding rations. These lectures are of importance to the farmer who produces the milk or to the factoryman who wishes to be intelligent on the subject and help his patrons.

DISEASES OF CATTLE.

PROFESSOR WHITE

The lectures on this subject consist of the following:

1. The anatomy of the cow with special reference to the digestion, reproduction and milk-producing organs.
2. The more common non-infectious diseases and their treatment.
3. Some of the most important infectious and contagious diseases of cattle and the methods of dealing with them.
4. Practical methods of confining and controlling cattle during operations, casting, etc., etc.

A fully equipped Veterinary College, including a Veterinary Hospital, furnishes ample means for demonstration.

TESTING MILK—AGRICULTURAL CHEMICAL LABORATORY.

BACTERIOLOGICAL LABORATORY, BIOLOGICAL HALL.

CHEMISTRY OF MILK, BUTTER AND CHEESE.

PROFESSOR WEBER

The work upon this subject embraces the following:

A brief outline of the principles of chemistry and chemical nomenclature, the chemistry of carbon, hydrogen, oxygen, nitrogen, and of ten other elements occurring in milk; the microscopical examination of milk, cream and skim milk; the chemical composition of milk; the relation of specific gravity, total solids and fats to each other, the optical methods of testing milk, cream and cheese; description and use of lactometers and creamometers.

BACTERIOLOGY.

PROFESSOR BLEILE

In this subject the instruction is given both by lectures and laboratory work. The student is first taught the general facts concerning bacteria and their relation to life processes. This is followed by lectures on their special application to milk, butter and cheese.

In the laboratory the students learn to prepare culture media, to make cultures and study them, and to estimate the number of bacteria in water, milk and air. Stress is laid upon the methods of pasteurization, sterilization and purification.

CARE OF STEAM ENGINES AND BOILERS.

PROFESSOR MAGRUDER

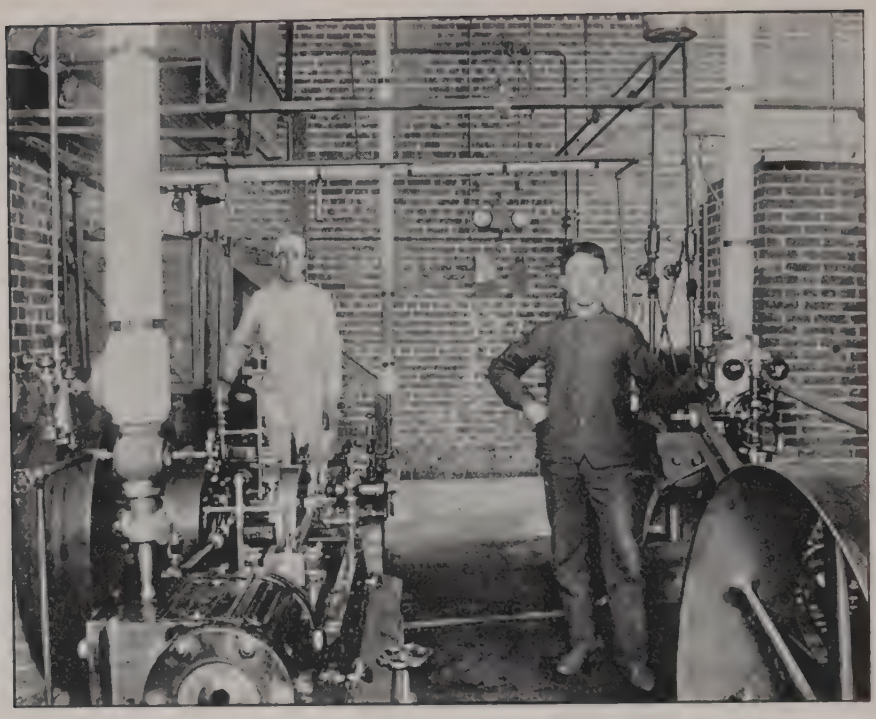
The object of these lectures is to give the student a knowledge of the theory of the generation and use of steam and as much practice in the operation of a steam power plant as time will permit. The student is instructed on the physics of steam, on the mechanics and mechanism of steam engines and steam pumps, and on the technical names and uses of the various parts of a boiler, engine, pump and injector. This class room work is accompanied by demonstrations of the best practice in handling and caring for a steam engine and boiler; ways of firing the boiler and feeding it from a steam pump and injector; on starting, stopping and oiling the engine; on packing the piston and valve rods; on setting the valves and adjusting the bearings. The laboratory work accompanying these lectures has been mentioned in connection with the description of the Dairy Power House.

EXPENSES.

College Dues.—Each student is required to pay an incidental fee of five dollars and a laboratory fee of ten dollars.

Other Expenses.—Books and stationery will cost from three to five dollars and two white duck suits to wear in the dairy laboratory will cost one dollar each.

Rooms and Board may be secured at the Dormitory on the University grounds, or in clubs and private families. The rates vary from $3.25 to $4.00 per week. The total expenses for the term, including, fees, board, room and books, etc., need not exceed sixty dollars and may be less. Any young



Interior of Dairy Power House.

Live Stock Judging Room.

man of ordinary ability can earn enough more the first season to more than pay for the total expense of the term.

While students in the longer courses can find some employment, a student in the dairy course should not try to work his way while attending the school as he needs all of his time in the school work, and the money required for expenses is so small that it can be easily provided before coming.

REQUIREMENTS FOR ADMISSION.

The number of students—men and women—that will be received in this course is limited to fifty. Candidates must be at least sixteen years of age and must pass examinations in arithmetic, geography, grammar and United States history, or bring High School or other acceptable certificates for these branches. A teacher's or Boxwell certificate will be accepted. Applicants who are twenty-one or over are admitted without examination, but they will be expected to file a statement of standing or certificates which they may hold. No person is promised admission without examination whose certificates are not filed prior to December 15.

HOW TO ENTER.

Students wishing to enter should write to John W. Decker, Townshend Hall, O. S. U., Columbus, Ohio, who will forward the necessary application blanks. When these blanks are returned properly filled out, the applicant's name will be placed on the advanced registration list. Applicants will be registered in the order in which these applications are received. When fifty have been registered no more can be received except to fill vacancies that may occur. Should a person whose name is on the registration list find from unforseen circumstances that may arise that he cannot attend, he will send notice and his place will be given to the next applicant in order on the waiting list.

LOCATION.

The University is located at the north end of Columbus, a city of 125,000 inhabitants. The campus and farm occupy 345 acres of ground. A few of the fine buildings are shown on the last page of this bulletin. The University can be reached from the depots by electric cars. Visitors are welcome.

OTHER COURSES.

For information concerning other courses in Agriculture or Domestic Science, address Dean of the College of Agriculture and Domestic Science, O. S. U., Columbus, Ohio. For general information about the University, address Executive Office, Ohio State University, Columbus, O.

A Few of the University Buildings.

ARMORY AND GYMNASIUM.

UNIVERSITY HALL.

TOWNSHEND HALL.

BIOLOGICAL HALL.

ORTON HALL.

University Bulletin

Series 5 Number 19

(Botanical Series No. 8
Edited by W. A. Kellerman)

Variation in Syndesmon Thalictroides

By
W. A. KELLERMAN, Ph. D.
Professor of Botany

COLUMBUS
PUBLISHED BY THE OHIO STATE UNIVERSITY
MAY, 1901

Entered at the Columbus Post Office as second-class matter.

in Fig. 1 C presents one simple and one compound leaf. At D greater complexity is indicated, there being in many plants besides the central flower three instead of only two axillary ones, and only one of the subtending leaves is compound. In the case shown at E two of the three involucral leaves are compound. As shown in F and G four leaves may contribute to form the involucre and each one subtend a flower; in some cases two of the leaves are compound, in others three or even all may be compound. Still other variations along this line occur, but space forbids a fuller enumeration.

It should be stated that although the pedicels and leaves as shown in the diagrams (Fig. 1) occupy but a small portion of the circle, as a matter of fact the leaflets are spread and so disposed as to occupy the entire area when viewed from above the plant, the leaflets being equidistant from each other, or contiguous but not overlapping, and therefore taking the most advantageous position so far as sunlight is concerned.

The very striking variation in regard to presence or absence of the petiole to the involucral leaves has been previously noted. An inspection of a very large number of specimens collected in the vicinity of Columbus and in Perry and Logan counties, as well as of specimens kindly sent for the purpose by Mr. F. H. Burglehaus, Prof. A. Wetzstein, and Supt. H. N. Mertz, shows that petiolate forms occur exclusively in some localities (Northwestern Ohio); in other places the sessile form only obtains (Eastern Ohio); and yet elsewhere both forms are about equally represented (Central Ohio). We can not regard the petiolate forms as in any real sense a variety (much less a distinct species) – since both sessile and petiolate leaves occur in countless cases on the same plant. But where the petiolate form occurs prevailingly or may be exclusively, it would be advantageous to designate the same; therefore I propose as follows:

Syndesmon thalictroides f. PETIOLATA nova forma. Involucral leaves prevailingly or exclusively with petioles 2-10 or even 25 or more millimeters in length; otherwise like the typical species. Toledo (F. H. Burglehaus), St. Marys (A. Wetzstein) and West Mansfield, occasionally at Columbus and Rendville.

Comparatively few monstrosities were observed. In one case only did merely one leaf and two flowers occur; often but one flower develops though two leaves occur as usual; in a few cases a single small leaf was seen on a pedicel. A more common teratological variation was the elongation of the axis at the usual point of insertion of the flowers and involucral leaves, often distantly separating the leaves with their axillary flowers; in one case the distance between the points of insertion of the leaves was nearly two inches. The sepals are occasionally excessively numerous.

A characteristic very prominent is the similarity of the several stems that come from the same root. If one presents the typical

form of flowers and leaves almost without exception the second (and third when present) do the same; if one varies in any respect rarely does the remainder fail to follow suit. This can be seen in the tabulation where two or more stems are indicated—both or all are given (except in Nos. 29, 30 and 49) as observed, in the successive serial numbers. Another instance of the persistency of an idiosyncracy, as we may call it, was observed in some Syndesmons taken from the woods by a gardener at Springfield, Ohio, over forty years ago. The flowers were bountifully double, and the plants have each year since faithfully presented the same striking peculiarity.

The tabulation that follows is based on specimens from Toledo (Lucas Co.), Nos. 1-30; from St. Marys (Auglaize Co.), Nos 31-48; from Steubenville (Jefferson Co.), Nos. 49-65; from West Mansfield (Logan Co.), Nos. 66-76; from Rendville (Perry Co.), Nos. 77-88; and from Columbus, Nos. 89-100. The number of stems to each plant is given in the second column; then follow in order the number of flowers to each stem, the number of simple leaves with length of their petioles in *milimeters*, the number of compound leaves with length (also in *milimeters*) of their petioles and finally of their petiolules.

TABULATION.

No.	1 Stems	2 Fls.	4 Simp. lvs.	1 Pet.	8 Comp. lvs.	2 Pet.	14 Petl. 3-8
"	2 "	2 "	3 "	1 "	4 "	1 "	4 " 2-3
"	3 "	1 "	3 "	1 "	4 "	1 "	4 " 2-3
"	4 "	2 "	4 "	1 "	10 "	2 "	9 " 3-7
"	5 "	2 "	3 "	0 "	— "	2 "	3 " 0-2
"	6 "	1 "	3 "	0 "	— "	2 "	6 " 3-6
"	7 "	1 "	3 "	1 "	13 "	1 "	15 " 6-6
"	8 "	2 "	4 "	1 "	12 "	2 "	12 " 3-7
"	9 "	2 "	4 "	1 "	3 "	2 "	3 " 2-3
"	10 "	3 "	4 "	1 "	11 "	2 "	12 " 2-4
"	11 "	3 "	4 "	0 "	— "	3 "	6–7 " 2-4
"	12 "	3 "	4 "	0 "	— "	3 "	2–3 " 1-2
"	13 "	2 "	4 "	3 "	6 "	0 "	— " —
"	14 "	2 "	3 "	2 "	6 "	0 "	— " —
"	15 "	3 "	4 "	1 "	9 "	2 "	9 " 2-5
"	16 "	3 "	4 "	1 "	8 "	2 "	7 " 2-4
"	17 "	3 "	4 "	0 "	— "	3 "	3 " 1-2
"	18 "	2 "	5 "	1 "	6 "	3 "	8 " 2-5
"	19 "	2 "	3 "	2 "	3 "	0 "	— " —
"	20 "	1 "	3 "	0 "	— "	2 "	7 " 2-4
"	21 "	1 "	4 "	2 "	4–5 "	1 "	5 " 2-3
"	22 "	3 "	3 "	0 "	— "	2 "	9 " 3-7
"	23 "	3 "	3 "	0 "	— "	2 "	6 " 2-3
"	24 "	3 "	3 "	0 "	— "	2 "	3 " 0-2

No.	25	Stems	1	Fls.	1	Simp. lvs.	1	Pet.	4	Comp. lvs.	1	Pet.	5	Petl.	2-3
"	26	"	1	"	4	"	1	"	5	"	2	"	7	"	2-4
"	27	"	2	"	4	"	1	"	12	"	2	"	16	"	3-8
"	28	"	2	"	3	"	0	"	—	"	2	"	7	"	2-3
"	29	"	7	"	4	"	1	"	8	"	2	"	10	"	3-6
"	30	"	7	"	3	"	0	"	—	"	2	"	8	"	3-6
"	31	"	2	"	4	"	0	"	—	"	3	"	3–4	"	1-2
"	32	"	2	"	3	"	0	"	—	"	2	"	2–3	"	1-2
"	33	"	1	"	4	"	1	"	2	"	2	"	3	"	½-2
"	34	"	1	"	3	"	0	"	—	"	2	"	4–5	"	1-2
"	35	"	1	"	3	"	1	"	4	"	1	"	5	"	1-2
"	36	"	1	"	3	"	1	"	3	"	1	"	4	"	½-2
"	37	"	1	"	3	"	0	"	—	"	2	"	4	"	1-2
"	38	"	2	"	3	"	0	"	—	"	2	"	4	"	1-2
"	39	"	2	"	3	"	0	"	—	"	2	"	6	"	2-3
"	40	"	1	"	3	"	0	"	—	"	2	"	2–3	"	1-2
"	41	"	2	"	3	"	1	"	3	"	1	"	3	"	1
"	42	"	2	"	3	"	1	"	2	"	1	"	2	"	1-1½
"	43	"	1	"	3	"	0	"	—	"	2	"	5	"	1-2
"	44	"	3	"	3	"	2	"	5	"	0	"	—	"	—
"	45	"	3	"	3	"	2	"	6	"	0	"	—	"	—
"	46	"	3	"	3	"	2	"	3	"	0	"	—	"	—
"	47	"	2	"	3	"	1	"	4	"	1	"	4	"	0
"	48	"	2	"	3	"	2	"	1	"	0	"	—	"	—
"	49	"	1	"	3	"	0	"	—	"	2	"	0	"	12-15
"	50	"	5	"	3	"	0	"	—	"	2	"	0	"	22-28
"	51	"	5	"	3	"	0	"	—	"	2	"	0	"	6-10
"	52	"	5	"	3	"	0	"	—	"	2	"	0	"	3-6
"	53	"	5	"	5	"	2	"	1	"	2	"	0	"	1-1½
"	54	"	5	"	3	"	0	"	—	"	2	"	0	"	1
"	55	"	1	"	3	"	0	"	—	"	2	"	0	"	6-6
"	56	"	6	"	4	"	1	"	15	"	2	"	0	"	15-25
"	57	"	3	"	4	"	1	"	2	"	2	"	0	"	6-26
"	58	"	3	"	4	"	1	"	2	"	2	"	0	"	20-25
"	59	"	3	"	4	"	1	"	1	"	2	"	0	"	3-6
"	60	"	3	"	4	"	1	"	1	"	2	"	0	"	15-20
"	61	"	3	"	4	"	2	"	0	"	2	"	0	"	3-6
"	62	"	3	"	3	"	0	"	—	"	2	"	0	"	4-8
"	63	"	3	"	4	"	1	"	1	"	2	"	0	"	15-23
"	64	"	3	"	4	"	0	"	—	"	3	"	0	"	5-18
"	65	"	3	"	5	"	1	"	0	"	3	"	0	"	2-10
"	66	"	2	"	2	"	1	"	2	"	1	"	2½	"	1½-2
"	67	"	2	"	3	"	2	"	2	"	0	"	—	"	—
"	68	"	2	"	4	"	1	"	1½	"	2	"	2	"	2-3
"	69	"	2	"	4	"	0	"	—	"	3	"	3-5	"	1-3
"	70	"	2	"	4	"	1	"	1	"	2	"	1½-2	"	2

SYNDESMON THALICTROIDES.

No.	71	Stems	2	Fls.	4	Simp. lvs,	1	Pet.	2	Comp. lvs.	2	Pet.	3-4	Petl.	2
"	72	"	2	"	4	"	1	"	2	"	2	"	2	"	1-2
"	73	"	2	"	3	"	0	"	2	"	2	"	4-5	"	2-3
"	74	"	2	"	4	"	1	"	2	"	2	"	2	"	1-2
"	75	"	2	"	3	"	0	"	—	"	2	"	4	"	2-3
"	76	"	1	"	1	"	2	"	1	"	0	"	—	"	—
"	77	"	1	"	3	"	0	"	—	"	2	"	0	"	5-12
"	78	"	1	"	3	"	0	"	—	"	2	"	0-2	"	3-7
"	79	"	1	"	3	"	0	"	—	"	2	"	2-3	"	1-4
"	80	"	1	"	3	"	0	"	—	"	2	"	1-3	"	2-5
"	81	"	2	"	3	"	0	"	—	"	2	"	5-6	"	5-9
"	82	"	2	"	3	"	0	"	—	"	2	"	1	"	2
"	83	"	1	"	4	"	0	"	—	"	3	"	0-6	"	2-8
"	84	"	2	"	3	"	0	"	—	"	2	"	2-3	"	1-2
"	85	"	2	"	3	"	0	"	—	"	2	"	0	"	15-18
"	86	"	2	"	3	"	0	"	—	"	2	"	0	"	2-5
"	87	"	2	"	4	"	0	"	—	"	3	"	0-7	"	0-6
"	88	"	2	"	5	"	0	"	—	"	4	"	0	"	2-4
"	89	"	2	"	4	"	1	"	4	"	2	"	0	"	4-6
"	90	"	2	"	4	"	1	"	5	"	2	"	0	"	5-8
"	91	"	2	"	4	"	1	"	1	"	2	"	0	"	3-5
"	92	"	2	"	4	"	1	"	2	"	2	"	0	"	5-8
"	93	"	1	"	4	"	0	"	—	"	3	"	0-10	"	8-28
"	94	"	1	"	5	"	1	"	22	"	3	"	0-25	"	4-23
"	95	"	1	"	4	"	0	"	—	"	3	"	0-15	"	9-33
"	96	"	1	"	4	"	0	"	—	"	3	"	0-8	"	6-25
"	97	"	1	"	3	"	0	"	—	"	2	"	6-7	"	2-4
"	98	"	1	"	1	"	2	"	4	"	0	"	—	"	—
"	99	"	2	"	4	"	1	"	4	"	2	"	5	"	2-3
"	100	"	1	"	3	"	1	"	3	"	1	"	4	"	1-2

From the above tabulation it may be seen that of the plants selected at random for examination 51 per cent. of the stems have three flowers and 49 per cent. have four or more; 10 per cent. have simple involucral leaves only, 44 per cent. have both simple and compound, and 46 per cent. have only compound involucrate leaves. Of the total number, 88 per cent. have one or all of the involucrate leaves petiolate, and 12 per cent. have only sessile ones. Observations of others on this interesting little plant are solicited—especially should the Ohio botanists, amateurs and pupils furnish such notes for publication in the OHIO NATURALIST.

EXPLANATION OF PLATE 9.—Syndesmon thalictroides; the leaves, etc., were used as negatives and the photographs were reduced by the engraver to less than one-half the natural size. Figs. 1, 2 and 3 show leaves from the same plant; figs. 4, 5 and 6 are from one and the same plant; figs. 7, 8, 9 and 10 are parts of the same plant; figs. 11, 12 and 13, also 14, 15 and 16 are each of one plant respectively; figs. 17 to 23 inclusive illustrate leaf variation, specimens taken from different plants, except figs. 22 and 23 which are from one and the same plant.

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SECOND ANNUAL SUPPLEMENT

to the

Fourth State Catalogue of Ohio Plants

By
W. A. KELLERMAN and F. J. TYLER

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No. 1. Fourth State Catalogue of Ohio Plants, by W. A. Kellerman.
No. 2. General methods in Bontanical Microtechnique, by John H. Schaffner.
No. 3. The Nutation of Helianthus, by John H. Schaffner.
No. 4. The Non-Indigenous Flora of Ohio, by W. A. and Mrs. Kellerman.
No. 5. First Annual Supplement to the Fourth State Catalogue of Ohio Plants, by W. A. Kellerman.
No. 6. Preliminary List of the Edible Fungi of Ohio, by Elma Brooks Perry.
No. 7. Mosses, Illustrative Samples, by W. A. Kellerman.
No. 8. Variation in Sydesmon Thalictroides, by W. A. Kellerman.
No. 9. Second Annual Supplement to the Fourth State Catalogue of Ohio Plants, by W. A. Kellerman and F. J. Tyler.

Copies of Nos. 4, 5, 6, 7 and 8, are yet obtainable; a few copies of No. 1 remain, but have been bound, and a charge of twenty cents is made to cover cost of binding and postage.

Second Annual Supplement to the Fourth State Catalogue of Ohio Plants.*

During the year that has elapsed since April, 1900, many additional specimens have been placed in the State Herbarium, as the following statement shows. The names of the collectors and the number of specimens furnished by each are indicated.

Aiken, Walter H.	5	Mertz, H. N.	1
Barchhoff, Sarah	1	Minor, C. A.	9
Bonser, Thos	25	Moseley, E. L.	1
Case, Mrs. Theano W.	216	Nettleton, A. W.	5
Claassen, E	1	Osburn, R. C.	4
Clayton, W. M.	7	Ricksecker, A. E.	2
Copeland, Lilian	1	Riddle, Lumina Cotton	19
DeLong, G. W.	1	Rood, Almond N.	3
Derby, S. C.	1	Schaffner, Jno. H.	1
Drushel, J. A	28	Sharp, Mrs. K. D.	152
Fullmer, E. L.	36	Shorten, J. W.	1
Gould, D. T.	2	Shull, Geo. A.	17
Griggs, R. F.	20	Stockberger, W. W.	3
Griggs, R. F. and Tyler, F. J.	1	Tangeman, Clara M.	6
Hacker, Otto	16	Thomson, F. E.	4
Hoops, H. W.	2	Tyler, F. J.	59
Howard, Emma	1	Tyler, F. J. and Wyman, T. B.	1
James, J. F.	1	Vandervoort, J. S.	5
Jaske, H	1	Watson, J. R.	3
Jennings, Otto E.	34	Webb, R. J.	58
Kellerman, W. A.	1,432	Weber, Sophia F.	1
Kellerman, W. A. and Mrs.	7	Weisman, Laura A.	1
Kellerman, W. A. & Beattie, W. R.	33	Werner, W. C.	1
Kellerman, W. A. & Fullmer, E. L.	11	Wetzstein, A	21
Kellerman, W. A. & Griggs, R. F.	18	Whipple, Frank	8
Kellerman, W. A. and K. F.	88	Wicks, A. H.	63
Kellerman, W. A. and K. F. and Beattie, W. R.	6	Wilcox, E. Mead	1
Kellerman, W. A. and K. F. and Jones, Victor	37	Wilkinson, E	1
Kellerman, W. A. and Tyler, F. J.	1	Williamson, E. B.	88
Keifer, R. J.	1	Winkler, H. J.	1
Krebs, Wm	2	Young, Rachel	4
Louth, E. V.	3	Young, W. W.	1
McFadden, L. H.	1	Total	2,585

ADDITIONS TO THE STATE CATALOGUE.

During the year the plants named below have been detected in our State for the first time; or in case of escapes and waifs, they have not heretofore been recorded as a part of the Ohio Flora.

Credit is given to first collectors and the original locality noted. The Serial No., with letter added, shows where in the previous list (Fourth Catalogue) the plants should be placed.

82*a*. Potamogeton nuttallii Cham. & Schw., Nuttall's Pondweed. Donor's Lake, Wayne County, Ohio. (Reported by A. D. Selby before meeting of Ohio Academy of Science, December 27, 1900.)

123*a*. Sorghum vulgare Pers. Occasionally escaped.

* The edition of the Fourth State Catalogue is almost completely exhausted. However, a few bound copies can be furnished; the cost of binding and postage is twenty cents.

212*a*. Bouteloua hirsuta Lag., Hairy Mesquite-grass. Ohio State University Campus, Columbus. F. J. Tyler.
212*b*. Bouteloua oligostachya (Nutt.) Torr. Mesquite-grass. Ohio State University Campus, Columbus. Alice Dufour.
258*a*. Bromus asper Murr. Hairy Brome-grass (London, Mrs. K. D. Sharp, Coll., E. Monroe, Highland Co., W. A. Kellerman, Coll.)
265*b*. Bromus breviaristatus (Hook.) Buckl. Short-awned Chess. Ashtabula, (W. A. Kellerman, Coll.)
270*b*. Secale cereale L. Rye. Here and there escaped.
472*a*. Wolffia braziliensis Wedd. Brazil Wolffia. Sandusky Bay. Abundant at times. R. F. Griggs.
488*a*. Juncus dichotoma Ell. Forked Rush. Cuyahoga County. (Edo Claassen.)
538*a*. Convallaria majalis L. Lily of the Valley. Abundantly escaped in Cemetery, Worthington. R. F. Griggs.
619*a*. Salix nigra x amygdaloides. A. D. Selby, 8th Report Academy of Science, p. 22, and others.
629. Change S. fluviatilis Nutt. to S. interior Rowlee. Rowlee in Bull. Torr. Bot. Club. 27: 247, 1900.
629*a*. Salix interior var. wheeleri Rowlee. Cedar Point, W. A. Kellerman and R. F. Griggs.
636*a*. Salix sericea x cordata. Ashtabula. (W. A. Kellerman, Coll.) R. F. Griggs.
637*a*. Salix petiolaris var. gracilis. Toledo. (J. A. Sanford, Coll., 1879.) R. F. Griggs.
638*a*. Salix candida x cordata. Castalia, Erie County. R. F. Griggs.
647*a*. Betula alba pendula Hortorum. Pendulous White Birch. Escaped; Painesville. (Otto Hacker.)
781*a*. Dianthus deltoides L. Maiden Pink. Escaped; Painesville. (Otto Hacker.)
781*b*. Dianthus barbatus L. Sweet William. Escaped.
864*a*. Berberis aquifolium. Pursh. (Mahonia aquifolium Nutt.) Seeding in Cemetery, Worthington. R. F. Griggs.
898*b*. Diplotaxus muralis (L.) DC. Diplotaxus. Cleveland, Ohio. Wm. Krebs.
936*a*. Erysimum repandum L. Logan County. (A. D. Selby in report before Ohio Academy of Science, December 27, 1900.)
963. Philadelphus inodorus L. Mt. Pleasant, Jefferson County. W. A. Kellerman.
1039*a*. Cratægus cordata (Mill.) Ait. Washington Thorn. Steubenville, Ohio. H. N. Mertz.
1042*a*. Cratægus polybracteata Ashe. (Reported in First Supplement, but without locality.) Franklin, Hocking and Summit Counties. W. A. Kellerman.
1042*b*. Cratægus pruinosa Wendl. Logan Co. W. A. Kellerman.
1042*c*. Cratægus succulenta. Franklin, Fairfield, Knox, Belmont, Summit, Ottawa, Union, Ross, Carroll, Shelby and Lucas Counties. W. A. Kellerman.
1045*a*. Cratægus multipes n. sp. (W. W. Ashe in Bulletin 175 N. C. Experiment Station, August, 1900.) Ohio, E. E. Bogue, Coll.
1117*a*. Lespedeza angustifolia (Ph) L. (L. capitata var. angustifolia Ph.) Narrow-leaf Bush-clover. Fulton County. (A. D. Selby in report at meeting of Ohio Academy of Science, December 27, 1900.)
1132*a*. Dolichos lablab L. Hyacinth Bean. Escaped from cultivation in several places in Columbus. Found growing on vacant lots, surrounded by large weeds. John H. Schaffner.
1188*a*. Rhus cotinus L. Escaped, Mt. Pleasant, Jefferson County. W. A. Kellerman.
1211*a*. Rhamnus caroliniana Walt. Carolina Buckthorn. Adams and Brown Counties. (W. A. Kellerman.)
1219*a*. Ampelopsis cordata Michx. Portsmouth, Scioto County. W. A. Kellerman.
1255. Lechea minor L. Steubenville, Ohio. H. N. Mertz.
1487*a*. Gilia coronopifolia Pers. Growing in a cemetery near Madison, Lake County. Spreading slowly. F. J. Tyler.
1526*a* Teucrium scorodonia L. European Germander. Escaped; Painesville, Lake County. Otto Hacker.

1526*b*. Teucrium occidentale Gr. Hairy Germander. Ohio, Riddell 1834 (Bull. Torr. Club, 28: 170). Reservoir Park, Perry Co. W. A. Kellerman.
1529*a*. Scutellaria serrata Andr. Showy Skullcap. Rio Grande, Gallia County. Ruth E. Brockett.
1605*a*. Solanum tuberosum L. Potato. Escaped.
1609*c*. Petunia violacea Lindl. Occasionally escaped.
1650*a* Gerardia besseyana Britt. (G. tenuifolia var. macrophylla Benth.) Bessey's Gerardia. Wooster. (J. W. T. Duvel; reported by A. D. Selby at meeting of the Ohio Academy of Science, December 27, 1900.)
1709*a*. Viburnum molle Mx. Soft leaf Arrowwood. Scioto County. W. A. Kellerman.
1714*a*. Linnæa borealis L. Twin-flower. Canton, Stark County. Mrs. Theano W. Case.
1729. Euphorbia lathyris L. Pomeroy, Meigs County. W. A. Kellerman.
1759*a*. Leontodon hastilis L. Dandelion. Escaped; Painesville, Lake County. (Otto Hacker.)
1766*b*. Lactuca saligna L. European Wild Lettuce. Dayton. (A. D. Selby.)
1777*a*. Hieracium greenii Porter & Britt. Green's Hawkweed. Wayne County. (Selby and Duvel; reported by A. D. Selby before meeting of Academy of Science, December 27, 1900.)
1919*a*. Polymnia canadensis var. radiata Gray. Cedar Point. Very abundant. R. F. Griggs.
1943*a*. Helianthus maximiliani Schrad. Sandusky. A single plant along railroad tracks. R. F. Griggs.
1986*a*. Chrysanthemum indicum Hortorum. Escaped; Adams County. W. A. Kellerman.

Cordial thanks are extended to all who have generously assisted in enlarging the State Herbarium, and the hope is entertained that even larger donations may be made in the future.

As in the Fourth Catalogue, so here is given the distribution by counties of the added specimens, using the serial number, as there, to designate the species.

DISTRIBUTION BY COUNTIES.

The previous records of county distribution will be found on page 51 of the Fourth State Catalogue of Ohio Plants and page 6 of the First Supplement to same. Here as there the figures refer to the serial number of the list. Contributions are solicited of all plants from each county not noted in this and the previous records. The number of specimens previously reported is noted in parentheses after the name of each county.

Adams (27 species previously reported) 12 25 35 38 49 56 68 72 74 76 118*a* 120 122 151 158 196 213 215 276 531 540 544 547 549 555 557 586 598 600 601 602 607 610 614 615 618 622 626 643 644 645 649 650 655 662 663 665 666 670 672 680 688 690 703 715 756 764 779 803 812 813 822 825 833 836 837 840 865 868 869 870 889 893 900 949 955 957 962 972 973 974 975 981 987 999 1003 1009 1022 1030 1031 1034 1035 1047 1053 1054 1055 1058 1060 1068 1086 1093 1094 1097 1101 1116 1130 1144 1145 1147 1149 1163 1168 1170 1183 1185 1186 1196 1197 1199 1200 1201 1204 1211*a* 1213 1216 1217 1219 1220 1225 1239 1244 1262 1280 1288 1292 1306 1314 1319 1322 1326 1327 1335 1337 1361 1368 1393 1406 1409 1416 1417 1419 1420 1440 1443 1445 1450 1453 1455 1463 1481 1488 1499 1513 1518 1519 1530 1538 1541 1543 1547 1560 1561 1565 1573 1576 1579 1593 1597 1600 1602 1605*a* 1609*b* 1610 1646 1648 1654 1666 1672 1674 1676 1677 1679 1693 1695 1697 1700 1703 1707 1712 1713 1717 1720 1724 1739 1751 1762*a* 1767 1802 1807 1839 1840 1841 1847 1854 1873 1889 1901 1903 1913 1920 1922 1927 1935 1937 1945 1952 1956 1961 1979 1984 1986*a* 1990 2001.

Allen (6 sp. reported), 0.

Ashland (41 sp. rep.), 1034 1397.

Ashtabula (278 sp. rep.), 87 113 117 184 234 312 732 904 954 993 1013 1052 1198 1217 1243 1249 1267 1328 1337 1547 1668 1699.

Athens (85 sp. rep.), 52 55 56 603 626 715 782 1188 1195 1197 1198 1465 1538 1582 1762*a* 1765 1793 1797 1962.

Auglaize (517 sp. rep.), 56 70 71 74 81 83 92 93 97 100 104 345 435 613 616 645 678 680 711 713 729 730 740 746 773 796 810 904 934 995 1034 1215 1244 1309 1321 1325 1348 1438 1489 1560 1582 1666 1699 1735 1767 1773 1798 1994.

Belmont (102 sp. rep.), 12 48 51 74 126 158 196 234 236 270*a* 276 295 510 528 537 544 572 610 621 622 628 639 645 680 687 715 718 737 782 803 813 826 845 848 865 868 876 877 893 896 901 904 907 964 971 980 983 985 987 1003 1031 1034 1054 1055 1067 1068 1144 1151 1167 1184 1197 1216 1219 1314 1335 1336 1345 1367 1408 1440 1446 1491 1498 1547 1566 1601 1611 1613 1632 1637 1673 1676 1677 1703 1715 1762 1762*a* 1765 1909 1979 2009.

Brown (12 sp. rep.), 8 45 74 118*a* 126 157 184 196 207*a* 213 236 274 348 463 528 531 548 549 550 551 555 601 603 610 617 618 626 629 643 654 658 663 666 668 672 675 676 678 680 688 694 700 703 711 715 717 718 731 734 747 750 756 758 779 812 813 821 822 833 837 818 866 867 868 869 870 876 889 893 904 907 962 973 974 985 987 999 1003 1009 1021 1022 1024 1028 1030 1031 1047 1053 1054 1058 1060 1068 1074 1078 1087 1144 1151 1163 1168 1170 1185 1195 1198 1200 1205 1206 1211*a* 1216 1223*a* 1231 1232 1245 1279 1292 1298 1306 1314 1319 1326 1327 1337 1338 1345 1354 1361 1368 1409 1416 1418 1419 1420 1440 1446 1453 1457 1467 1470 1526 1538 1541 1543 1555 1566 1578 1580 1584 1597 1599 1601 1602 1609 1610 1611 1613 1615 1622 1632 1634 1666 1673 1674 1676 1677 1679 1688 1695 1697 1700 1703 1709 1712 1724 1739 1739*c* 1741 1745 1765 1766 1767 1809 1845 1899 1915 1916 1920 1980 1990 1999 2009 2012.

Butler (86 sp. rep.), 517 904 1216 1428 1560 1637 1780 1782 1783 1798 1963 1969.

Carroll (144 sp. rep.), 551 1022 1047 1116 1203 1215 1244 1393 1398 1400 1445 1463 1518 1574 1767.

Champaign (141 sp. rep.), 505 602 714 715 1782 1786.

Clarke (331 sp. rep.), 194 1267.

Clermont (421 sp. rep.), 5 853 1338.

Clinton (118 sp. rep.), 771 821 853 1490 1635.

Columbiana (30 sp. rep.), 462 477 501 534 535 537 539 540 554 558 560 565 695 710 713 720 789 811 815 829 835 838 845 848 849 852 853 867 879 886 916 917 920 951 954 958 972 975 980 985 987 1003 1034 1052 1074 1077 1078 1087 1089 1118 1133 1141 1144 1178 1194 1205 1260 1262 1267 1272 1273 1274 1276 1317 1318 1328 1351 1359

1361 1389 1486 1488 1507 1605 1620 1637 1654 1692 1703 1712 1715 1778 1870 1897 1898 1900 1984 2006.

Coshocton (134 sp. rep.), 904 931 948 1219 1272 1455 1467.

Crawford (110 sp. rep.), 571 574 744 784 904 993 995 999 1021 1053 1244 1271 1631 1634.

Cuyahoga (521 sp. rep.), 711 790 898*a* 993 1034 1200 1407 1530 1700 1782 1998.

Darke (45 sp. rep.), 0.

Defiance (253 sp. rep.), 56 510 1021 1022 1101 1112 1117 1166 1245 1296 1297 1328 1393 1654 1685 1773 1778 1780.

Delaware (162 sp. rep.), 295 550 558 628 690 744 1022 1166 1336 1366 1398 1580 1582 1635 1637 1764 1797 1965.

Erie (380 sp. rep.), 123 164 482 509 550 555 708 709 723 748 749 820 823 834 889 905 931 948 1034 1036 1048 1101 1199 1297 1298 1337 1363 1411 1456 1465 1487*a* 1500 1554 1561 1574 1581 1582 1584 1592 1605*a* 1621 1631 1739*b* 1744 1745 1762*a* 1772 1782 1786 1794 1797 1896 1919*a* 1941 1952 2014.

Fairfield (262 sp. rep.), 472 904 1200 1309 1393 1449 1581 1767.

Fayette (1 sp. rep.), 0.

Franklin (686 sp. rep.), 516 663 674 681 709 821 875 1131*a* 1215 1216 1276 1463 1735 1760 1763.

Fulton (116 sp. rep.), 115 200 314 467 507 534 547 556 708 790 904 993 1022 1185 1218 1326 1335 1351 1361 1365 1393 1398 1760 1917.

Gallia (147 sp. rep.), 0.

Greene (104 sp. rep.) 55 56 542 551 558 618 773 805 826 914 1087 1125 1211 1329 1458 1489 1507 1561 1748 2004.

Guernsey (59 sp. rep.), 1153 1217 1463 1501 1582.

Hamilton (310 sp. rep.), 558 1245 1782 1783 1950.

Hancock (82 sp. rep.), 295 550 603 690 778 789 1198 1216 1271 1366 1700.

Hardin (141 sp. rep.), 55 56 309 510 558 605 690 717 784 821 848 853 904 993 1273 1328 1336 1337 1363 1364 1366 1407 1463 1490 1492 1637 1695 1699.

Harrison (80 sp. rep), 51 76 113 270*a* 461 516 611 614 617 624 629 657 668 672 676 684 848 861 865 870 903 965 985 987 991 1009 1010 1022 1031 1034 1054 1077 1196 1197 1198 1202 1204 1220 1222 1239 1243 1417 1421 1453 1467 1537 1635 1688 1699 1735 1764 1766 1767 1899.

Henry (o sp. rep.), 0.

Highland (185 sp. rep.) 52 509 603 667 993 1036 1244 1364 1463 1582 1700 1767 1927.

Hocking (216 sp. rep.), 550 560 577 602 605 698 737 771 910 1021 1022 1034 1099 1101 1116 1132 1147 1199 1216 1217 1296 1337 1406 1463 1467 1501 1561 1575 1582 1635 1637 1709*a* 1710 1780 1805.

Holmes (141 sp. rep.) 51 56 600 1021 1101 1237 1296 1453 1580 1582 1773 1900 1966 1968 1969.

Huron (66 sp. rep.), 129 684 717 729 747 748 762 789 905 920 1015 1077 1078 1144 1162 1166 1296 1366 1519 1580 1593 1597 1600 1601 1616 1628 1634 1664 1747 1762*a* 1798 1913 1915 1927 2014.

Jackson (134 sp. rep.), 12 896 1034 1103 1114 1116 1147 1215 1236 1244 1398 1627 1647 1693 1697 1764 1767 1768 1779 1782 1798 2013.

Jefferson (3 sp. rep.), 51 74 76 126 158 184 196 207*a* 234 235 295 348 463 510 528 537 547 550 600 602 603 610 614 616 617 618 624 629 639 643 654 666 672 674 675 678 683 695 700 703 723 729 756 763 773 779 782 789 796 812 813 822 837 845 864 867 868 870 876 877 887 889 893 907 910 920 931 951 954 958 964 965 972 974 985 987 993 1003 1009 1025 1030 1031 1035 1047 1050*a* 1053 1054 1058 1059 1068 1074 1077 1078 1087 1128 1133 1144 1145 1166a 1188 1195 1200 1201 1205 1220 1222 1225 1243 1255 1262 1319 1326 1335 1345 1346 1354 1367 1406 1417 1423*a* 1440 1446 1453 1489 1490*a* 1491 1539 1541 1542 1547 1565 1585 1592 1600 1602 1605 1606 1610 1611 1613 1632 1635 1638 1673 1675 1676 1677 1695 1700 1703 1707 1712 1715 1739 1762 1762*a* 1765 1766 1767 1848 1899 1917 1919 1927 1973 1979 1980 1984 2012.

Knox (215 sp. rep.) 56 550 559 771 784 904 948 1035 1047 1097 1215 1217 1219 1393 1394 1397 1634 1735 1765 1777 2006.

Lake (216 sp. rep.), 32 45 60 62 65 74 110 212 275 309 599 643 647*a* 686 720 732 756 781*a* 805 822 832 854 868 870 894 952 983 1014 1078*a* 1088 1097 1118 1144 1153 1172 1178 1209 1245 1290 1296 1335 1354 1405 1409 1423*a* 1487*a* 1501 1526

1529 1541 1543 1573 1582 1593 1604 1610 1613 1674 1676 1679 1688 1715 1740 1759*a* 1802 1807 1927 1937*a* 1943*a* 1949 1980 1997 1998.

Lawrence (119 sp. rep.), 0.

Licking (346 sp. rep.), 558 690 771 930 1099 1108 1244.

Logan (110 sp. rep.), 90 537 603 905 1021 1103 1198 1218 1296 1580 1640 1794.

Lorain (419 sp. rep.), 1218 1719.

Lucas (236 sp. rep.), 56 904 1022 1034 1047 1218 1711.

Madison (233 sp. rep.), 51 74 110 113 119 122 126 153 154 157 194 207*a* 211 213 235 294 295 312 468 469 510 515 520 531 537 538 550 551 555 559 619 632 633 638 645 675 690 711 714 717 718 725 744 803 807 813 833 836 842 845 860 861 893 900 904 906 916 952 961 974 975 993 1016 1022 1025 1041 1044 1047 1066 1100 1102 1112 1128 1145 1149 1150 1166 1168 1178 1195 1198 1209 1211 1227 1243 1288 1297 1329 1336 1348 1349 1363 1364 1366 1408 1417 1425 1450 1463 1518 1530 1548 1553 1561 1580 1585 1590 1602 1606 1608 1635 1644 1678 1699 1709 1711 1715 1735 1745 1747 1753 1764 1766 1772 1782 1796 1798 1802 1807 1823 1831 1840 1845 1900 1927 1931 1937 1944 1952 1954 1957 1961 1963 1964 1967 1968 1971 1978 1994 1999 2001 2005 2012.

Mahoning (10 sp. rep.), 523 786 880 913.

Marion (23 sp. rep.), 0.

Medina (128 sp. rep.), 520 558 789 917 974 993 1034 1043 1272 1273 1274 1276 1467 1488 1495 1713 2004.

Meigs (112 sp. rep.) 904 1099 1103 1166 1465 1582 1627 1764 1798 1899 1966 1968.

Mercer (20 sp. rep.), 294 1582 1797 1962.

Miami (70 sp. rep.), 904 1047 1053 1200 1296 1582 1765 1771 1772 1797 1899.

Monroe (132 sp. rep.), 118*a* 267*a* 274 600 601 610 618 622 626 643 666 672 687 695 715 723 757 772 796 813 867 870 909 983 1021 1031 1035 1047 1055 1077 1087 1151 1184 1194 1195 1199 1201 1206 1216 1222 1223 1306 1326 1337 1345 1352 1354 1363 1367 1400 1408 1423 1440 1455 1489 1491 1561 1601 1609 1609*c* 1632 1670 1676 1719 1739*a* 1762*a* 1765 1767 1899 1918 1973 1980 1984.

Montgomery (188 sp. rep.), 551 1634 1804.

Morgan (111 sp. rep.), 550 744 1022 1147 1216 1244 1246 1561 1765.

Morrow (0 sp. rep.), 0.

Muskingum (118 sp. rep.), 718 1202 1237 1244 1328 1398.

Noble (109 sp. rep.), 1022 1101 1112 1215 1463 1686.

Ottawa (189 sp. rep.), 119 126 151 157 158 160 207*a* 234 235 236 276 600 601 603 610 612 617 645 658 660 667 674 678 683 707 709 714 718 725 734 744 751 752 756 782 832 834 836 851 861 893 896 907 927 1016 1025 1035 1054 1059 1060 1094 1099 1100 1101 1102 1104 1114 1117 1128 1132 1149 1150 1162 1163*a* 1166 1170 1178 1184 1185 1196 1205 1209 1298 1335 1337 1352 1363 1417 1421 1454 1463 1465 1470 1500 1526 1566 1580 1581 1582 1600 1601 1604 1605*a* 1609 1615 1674 1675 1695 1703 1709*a* 1711 1715 1739*b* 1740 1762*a* 1766 1767 1783 1790 1794 1807 1824 1839 1840 1868 1901 1937 1941 1945 1949 1999 2013 2018.

Paulding (52 sp. rep.), 1581 1783.

Perry (110 sp. rep.), 90 100 535 709 711 714 715 816 1022 1309.

Pickaway (46 sp. rep.), 904 1099 1296 1319 1621 1735 1772 1797 1798.

Pike (97 sp. rep.), 558 789 904 932 982 1329 1735 2006.

Portage (82 sp. rep.), 1 8 19 25 37 38 45 509 523 539 560 565 569 570 579 582 583 584 587 597 598 599 689 737 778 781b 811 814 866 883 977 1001 1006 1052 1058 1072 1101 1168 1170 1190 1203 1251 1264 1270 1275 1286 1328 1359 1370 1376 1380 1452 1570 1640 1661 1695 1697 1901.

Preble (3 sp. rep.), 0.

Putnam (34 sp. rep.), 51 687 1052 1582.

Richland (307 sp. rep.), 506.

Ross (147 sp. rep.), 51 522 543 695 710 730 759 815 838 845 860 867 876 916 951 1099 1141 1177 1215 1243 1262 1272 1274 1443 1463 1465 1466 1486 1495 1507 1510 1523 1539 1548 1560 1611 1635 1712 1766 1767 1772 1797 1954.

Sandusky (17 sp. rep.), 8 9 10 19 46 51 56 137 333 365 377 468 503 519 523 531 534 537 539 547 558 598 690 784 789 812 813 821 823 836 837 853 861 958 1003 1022 1045 1065 1094 1136 1144 1274 1409 1439 1463 1489 1491 1507 1543 1548 1561 1605 1654 1692 1698 1707 1745 1748 1898 1908 1930 1979.

Scioto (109 sp. rep.), 4 35 45 51 71 74 118*a* 207*b* 222 235 236 274 294 348 550 557 600 603 610 622 636 654 657 695 700 703 709 711 714 718 814 839 852 904 932 952

972 980 987 1016 1031 1034 1047 1054 1067 1120 1147 1151 1162 1166 1184 1195 1200 1215 1218 1219*a* 1222 1223*a* 1231 1244 1245 1274 1385 1414 1440 1446 1453 1463 1481 1566 1601 1605*a* 1611 1675 1679 1697 1762 1765 1766 1767 1782 1807 1822 1823 1840 1873 1889 1913 1937 1954 1959 1975 1984 2012.

Seneca (83 sp. rep.), 509 522 551 690 1198 1634 1694 1697 1699.

Shelby (156 sp. rep.), 295 617 723 789 1021 1022 1047 1244 1500 1561 1574 1575 1582 1699 1764 1797.

Stark (174 sp. rep.), 53 70 107 464 465 468 482 501 502 505 509 514 519 523 537 538 539 540 554 565 574 584 591 593 597 643 650 651 672 674 683 685 689 704 709 710 711 714 716 723 725 739 748 754 756 758 759 767 771 779 782 784 788 790 796 803 817 827 833 834 835 836 837 845 853 876 879 901 904 906 910 913 916 945 952 954 960 961 965 966 977 993 999 1001 1003 1011 1021 1022 1032 1034 1047 1053 1067 1073 1074 1077 1093 1114 1116 1128 1153 1156 1159 1162 1170 1182 1197 1202 1205 1211 1239 1244 1245 1272 1290 1296 1298 1299 1305 1306 1319 1326 1329 1344 1348 1353 1357 1359 1360 1366 1370 1377 1382 1386 1387 1390 1393 1394 1397 1401 1403 1407 1409 1411 1412 1421 1445 1452 1463 1470 1486 1488 1504 1517 1518 1519 1530 1539 1561 1564 1565 1566 1574 1575 1576 1584 1592 1600 1601 1616 1617 1621 1628 1634 1640 1650*a* 1653 1654 1660 1663 1664 1674 1686 1697 1700 1711 1714*a* 1735 1739 1740 1741 1744 1748 1750 1752 1753 1757 1764 1767 1783 1788 1790 1794 1797 1802 1806 1807 1814 1822 1840 1843 1845 1868 1901 1902 1913 1915 1916 1922 1927 1931 1934 1935 1956 1961 1968 1972 1975 1999 2001 2003 2013 2017 2018.

Summit (376 sp. rep.), 102 307 309 312 482 511 549 600 672 727 905 987 993 1034 1198 1243 1296 1337 1362 1501 1582 1627 1630 1649 1767 1899.

Trumbull (90 sp. rep.), 82*a* 520 570 711 821 849 1021 1208 1407 1615 1780 1899.

Tuscarawas (106 sp. rep.), 723 1147 1216 1504 1561 1605*a* 1768 1899.

Union (135 sp. rep.), 1047 1215 1244 1580 1582 1767 .

Van Wert (0 sp. rep.), 0.

Vinton (106 sp. rep.), 48 236 551 601 603 660 666 670 703 812 868 969 1022 1031 1034 1054 1112 1196 1204 1220 1222 1245 1296 1349 1388 1438 1580 1712 1717 1765 1773 1780 1782 1783 1794 1798 1805 1965 1966.

Warren (41 sp. rep.), 0.

Washington (32 sp. rep.), 674 1794.

Wayne (120 sp. rep.), 558 789 1202 1245 1566 1765 1767 1898.

Williams (161 sp. rep.), 55 70 509 537 606 690 711 735 842 861 904 948 993 1020 1022 1034 1185 1198 1262 1326 1328 1363 1366 1387 1393 1394 1395 1450 1467 1605*a* 1695 1699 1700.

Wood (1 sp. rep.), 0.

Wyandot (127 sp. rep.), 122 129 154 157 550 562 620 889 910 1112 1199 1260 1271 1296 1337 1366 1411 1582 1700 1735 1765 1773 1783 1847 1941 1950.

OHIO STATE UNIVERSITY.

Courses Given by the Botanical Department.

1. Elementary Botany. Spring term. Five hours.
3. Systematic and Physiological Botany. Fall term. Five hours. (Course for students in Pharmacy.)
4. Medical Botany. Winter term. Laboratory work. Two hours.
6. Physiological Botany. Fall term. Five hours. (This and the two following courses for students in Agriculture, Horticulture and Domestic Science.)
7. Physiological and Economic Botany. Winter term. Five hours.
8. Vegetable Pathology. Spring term. Five hours.
9. Dendrology (study of native trees). Fall term. Two hours.
10. Dendrology (Laboratory work, special investigation). Winter term. Two hours.
11. Laboratory work, special investigation in Economic Botany and Vegetable Pathology. Fall, winter and spring terms. Two to five hours.
16. Laboratory work in Medicinal and poisonous plants, adulterations, etc. Fall, winter and spring terms. Two to five hours.
21. Ecology. Fall term. Three hours.
22. Morphology and Physiology. Winter term. Three hours.
23. Systematic Botany. Spring term. Three hours.
24. Laboratory and Field work. Fall, winter and spring terms. Two or three hours.
25. Laboratory work in Histology and Physiology. Fall, winter and spring terms. Three to five hours.
26. Advanced Laboratory work in Histology and Michrotechnique. Fall, winter and spring terms. Five hours.
27. Laboratory and Field work in Systematic Botany. Fall, winter and spring terms. Three to five hours.
28. Research work in Systematic Botany. Fall, winter and spring terms. Five hours.
29. Research work in Morphology and Physiology. (Graduate course.) Fall, winter and spring terms. Five or ten hours.
30. Monographic work. (Graduate course.) Fall, winter and spring terms. Five or ten hours.
31. Research work in Ecology. (Graduate course.) Fall, winter and spring terms. Five or ten hours.
32. Minor Investigations. Fall, winter and spring terms. One or two hours.
33. Bibliography, critical reading and indexing botanical literature. Fall, winter and spring terms. One or two hours.

University Bulletin. Series 5, No. 20.

Ohio State University

CONTRIBUTIONS FROM THE

Department of Zoology and Entomology

No. 5.

THE FISHES OF OHIO

BY

RAYMOND C. OSBURN, M. Sc.

[REPRINTED FROM SPECIAL PAPERS NO. 4, OHIO ACADEMY OF SCIENCE, 1901.]

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1901.

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F. M. WEBSTER,
H. C. BEARDSLEE,
WILLIAM R. LAZENBY,
Trustees.

DEDICATION.

To the memory of my dear friend and teacher, the late Professor David Simons Kellicott.

THE FISHES OF OHIO.

An Authenticated List, with Especial Reference to Occurrence and Distribution.

INTRODUCTION.

THE purpose of this work is to bring together the results of the investigations on the fishes of Ohio, which have from time to time been made in various localities within the state, and to compile an authenticated list of the fishes of Ohio, which shall include only such species as have been definitely reported for the state by some collector. An attempt has also been made to show the distribution in the state, of each species, by citing all the records of occurrence which could be obtained. The results show that many species are so widely distributed and so abundant that they have been taken by every collector in the state; some are widely distributed, but nowhere common; others have been taken commonly in one or two localities, but not elsewhere; and still others are so rare that only single individuals have been recorded.

Before proceeding with the list it may be of interest to glance at the work of some of the collectors of Ohio fishes, as shown by their publications.

The work in the Ohio Valley was begun by C. S. Rafinesque, in a paper dated at Louisville, Kentucky, July 20, 1818. This paper was followed by a number of others in rapid succession, and in December, 1819, to November, 1820, Rafinesque published in a series of articles in the "Western Review and Miscellaneous Magazine," his "Ichthyologia Ohiensis," which, as Dr. Call says, "laid the literary foundation of American Ichthyological Science." As Rafinesque's paper covered the Ohio River System, it is not definitely known how many species he took within the limits of Ohio, but he mentions about twenty-five

species as occurring in the streams of the state, Muskingum, Hocking and Miami Rivers and the Ohio River "as far as Pittsburgh." Rafinesque makes mention of one hundred and eleven species as occurring in the Ohio and its tributaries, but of this number, as Dr. Jordan says, "upwards of forty-three are either spurious or redundant." Of the one hundred and thirty-four native species now recorded for Ohio, Rafinesque described thirty-four. Further comment on Rafinesque's work is unnecessary, as it has been reviewed by various later writers, especially by Dr. Jordan. Dr. R. E. Call has recently published an edition of the Ichthyologia Ohiensis in the original text, accompanied by a biographical sketch.

The first paper to appear, dealing entirely with the fishes of the state, was that by Dr. Jared P. Kirtland, published in the Second Annual Report of the Geological Survey of Ohio, and bearing date of November 1, 1838, at Cincinnati. In this paper Dr. Kirtland gave a list of seventy-two species belonging to Ohio. Of this number, at least twelve are redundant. In the "Family Visitor," of 1850, however, Kirtland gave a corrected list, in which seven doubtful species of his former list were omitted, and two other species added, thus reducing his list to sixty-seven species, of which number at least sixty-one are good. Kirtland published other papers on Ohio fishes, his most important work being "Descriptions of the Fishes of Lake Erie, the Ohio River and their Tributaries," which appeared in the "Boston Journal of Natural History," as a serial, in 1840–46. Eight species of our present list were described by Dr. Kirtland, and his careful work resulted in many valuable contributions to ichthyological knowledge.

The next work of importance on Ohio fishes was that of Mr. John H. Klippart, of the State Fish Commission, published in the first and second annual reports of the commission. The first report, for the years 1875–76, contains descriptions of twenty-five species "copied and arranged from the manuscript of Prof. D. S. Jordan, by his assistant, Chas. H. Gilbert," with comments and notes by Klippart, and with plates of nineteen species drawn by Miss Josephine Klippart. The same report also contains a list of one hundred and eighty-five species of fishes "supposed to occur

in Indiana, and therefore in Ohio." In regard to this, Klippart remarks, "Messrs. Jordan and Gilbert's Catalogue of the Fishes of Indiana is here given, under the belief that the same species of fishes found in Indiana south of the watershed may be found in the waters of Ohio." The list contains many species not recorded for Ohio after the lapse of a quarter of a century, and some that, owing to peculiarities of distribution, probably never will be taken. The second report contains descriptions of twenty-four species "arranged from manuscript of Prof. D. S. Jordan, by his assistant, Mr. Ernest Copeland," with plates of sixteen species. As a whole the reports contain much that is good.

By far the most important paper on Ohio fishes is that by Prof. David Starr Jordan, published in the fourth volume of the Report on the Geology of Ohio, entitled a "Report on the Fishes of Ohio," and bearing date of December 10, 1878. Dr. Jordan was at that time connected with Butler University, in Indiana, and his services in the preparation of the report were engaged by Prof. J. S. Newberry, the State Geologist of Ohio. This report contains, besides the synonymy and many valuable notes in regard to habits, careful descriptions of a hundred and sixty-five species of fishes supposed to occur in Ohio. Of this number, nine have since proved to be redundant, while three others have been reduced to varietal rank. Of the remaining number described, more than fifty had not at that time been taken within the limits of the state, but were included because their range was such as made their occurrence within the state probable. Many of these have since been noted, but at the time of publication of Jordan's Report only about one hundred species had been recorded for the state.

Following Jordan's Report, in more recent years have appeared a number of papers dealing with investigations more local in their nature, but all contributing materially to our knowledge of the occurrence and distribution of Ohio species. The first of these of which I have any knowledge, appeared in the Journal of the Cincinnati Society of Natural History, for July-October, 1888, under the title, "Contributions to the Ichthyology of Ohio, No. 1," by Dr. J. A. Henshall, and gave a list, with occurrence notes, of seventy species noted in Hamilton County.

This was followed in January, 1889, by a second paper, more general in its nature, adding forty species noted at various points in the state, and making a state list of a hundred and ten species noted by himself. Localities were given for all the species mentioned.

In 1892 appeared "A Descriptive List of the fishes of Lorain County, Ohio," as "Laboratory Bulletin No. 2," of Oberlin College, by Mr. L. M. McCormick. This list includes eighty-eight species "resting upon specimens preserved in the museum," with brief descriptions, and notes on occurrence and habits, and with plates of eighteen species.

In 1893, Dr. Philip H. Kirsch, at that time Fish Commissioner of Indiana, investigated the Maumee River and its tributaries, under the direction of the U. S. Commission of Fish and Fisheries. Kirsch's paper, "Report upon Investigations in the Maumee River Basin During the Summer of 1893" (Bull. U. S. Fish Com., 1894), includes a list of eighty-seven species of fishes, with descriptions of the streams and lakes of the system, and many interesting notes. The report includes the unpublished notes of a small collection of fishes made in Defiance County by Prof. S. E. Meek, in 1887. Although the investigations covered portions of the Maumee Basin in Indiana and Michigan as well as in Ohio, the occurrences for each locality are definitely noted, and eighty-two of the eighty-seven species mentioned by Kirsch are recorded for localities in Ohio.

In the summer of 1897, Mr. E. B. Williamson and the writer investigated the streams of Franklin County, and published the results in a paper entitled "A List of the Fishes of Franklin County, Ohio, with a description of a new species of Etheostoma, by R. C. Osburn and E. B. Williamson" (Sixth Annual Proceedings of the Ohio State Academy of Science, 1898). The list includes sixty-nine species, with occurrence notes, and some color notes on the rarer species, together with many breeding dates, and a table showing distribution.

A somewhat similar investigation was carried on in the summer of 1898, by Messrs. J. B. Parker, E. B. Williamson and the writer, and the results appeared in the Seventh Annual Proceedings of the Ohio State Academy of Science, 1899, under the title,

"A Descriptive List of the Fishes of Big Jelloway Creek, Knox County, Ohio." Many color descriptions of species in high breeding coloration are given, and some interesting breeding and occurrence notes.

Prof. E. B. Williamson has kindly furnished the author with an unpublished list of twenty-six species taken by him in the vicinity of Salem, Columbiana County.

During the summers of 1899 and 1900, aided by a portion of the Emerson McMillin fund of the Ohio Academy of Science, the writer was enabled to investigate some parts of the state not before studied, and, as the general distribution of the food fishes was already quite well known, attention was turned more directly to the smaller and less conspicuous species. As a result of the investigation, several species not previously noted have been added to the list for the state, and a number of rare species recorded for new localities and their range extended, while the knowledge of the distribution of many of the more common species in the state has been considerably furthered. Ten days spent in the vicinity of Ironton, seining in the Ohio River and Ice Creek, a small tributary of the Ohio, and in Johns Creek, a tributary of Symmes Creek, gave some interesting results. The Ohio River, with its tributaries, Wheeling Creek and McMahon Creek, was also seined in the vicinity of Bellaire. The shallow waters of Sandusky Bay were hauled in many places and *Notropis heterodon* was added to the state list. The Huron River, with one of its small tributaries, was seined in the vicinity of Milan, and fifty species, nearly all common, were taken. Ashtabula Creek, in Ashtabula County, was seined, but yielded only a meager list, due to the fact that the stream flows for nearly its whole course over a solid shale bottom. The small streams forming the headwaters of the Wabash River, in Mercer County, yielded a good representative list, forty-nine species being taken. Stillwater and Wolf Creeks, tributaries of the Miami, near Dayton, were hauled, and *Exoglossum maxillingua* taken—a most unexpected find. The Cuyahoga River and its tributary, Breakneck Creek, were seined near Kent, and the Cuyahoga again at Hawkins; Grand River, with its small tributaries, was hauled for some distance above Painesville, and the Chagrin River was

touched at Willoughby ; Chippewa Lake, near Medina ; Summit Lake, at Akron, and Pippin Lake, near Kent, were investigated, and some time was also spent at Buckeye Lake, better known as the Licking Reservoir ; and the North Fork of Licking River, with some of its small tributary streams, was seined near Newark. The results of these investigations will be found embodied in the occurrence notes of the following list.

No attempt was made to collect the parasites of fishes, but in a few cases these were common enough to attract the attention of even the casual observer. In Ashtabula Creek a species of leech was found attacking the catfish. The largest of the leeches were about one and one-half inches in length. They were found usually attached to the lower jaw among the barbels, which in color they closely resembled. Not a catfish was taken in this stream but what bore the evidence of the work of this parasite, and frequently a half dozen leeches would be found on a single small catfish. In the headwaters of the Wabash River, in Mercer County, a species of crustaceous parasite was found in great numbers attacking especially the suckers and minnows. So numerous were they that it was difficult to find individuals of *Catostomus commersonii* and *Campostoma anomalum*, the species most affected, without at least one of these parasites. The points of attack were chiefly the regions immediately behind the pectoral and ventral fins, probably because they were most protected in such position. A Myxosporid parasite attacking *Notropis cornutus* was noted for a number of localities in central and northern Ohio. This species has been partially described by Linton (Psorosperm of *Notropis megalops* [*cornutus*], Linton, Bull. U. S. Fish Com. for 1889 (1891), IX, pp. 459–61, pl. 120, figs. 1–3), from specimens taken by Mr. L. M. McCormick, in Black River, Lorain County, September 1, 1890, and again on October 5, 1891 ; and Gurley mentions it with additional notes ("The Myxosporidia or Psorosperms of Fishes," by R. R. Gurley, Report of the Commissioner of Fish and Fisheries for 1892 (1894), 12. Genus et sp. incert., pp. 182–3, pl. 7, figs. 1–3). This Psorosperm has been noted by the writer on *N. cornutus* from Franklin County, and from Licking Reservoir in the Ohio River drainage, and from Huron River, Cuyahoga River, Grand River, and Chagrin River,

tributary to Lake Erie. The species is evidently not, as believed by McCormick, "restricted to a very narrow geographical range." The cysts formed by this parasite reproducing in the subcutaneous tissue may reach a diameter of one-third inch, and as many as eleven cysts have been noted on a single fish. It would seem that in some cases they must inevitably cause the death of the host.

Specimens of all the species of fishes recorded by Kellicott, Williamson, Parker and the writer are deposited in the museum of the Ohio State University.

In the preparation of this paper free use has been made of the works of the various writers on Ohio fishes, of "The Fishes of North and Middle America" (Bulletin 47, U. S. National Museum), by Drs. David Starr Jordan and Barton W. Evermann; of Dr. O. P. Hay's "Lampreys and Fishes of Indiana" (19th Annual Geol. Rept. of Ind.), and of the reports and bulletins of the U. S. Commission of Fish and Fisheries. The classification is that adopted by Jordan and Evermann in Bulletin 47, U. S. Natl. Mus. The keys for the separation of families, genera and species have, for the most part, been taken from the same work, but modified and abridged to meet the requirements of the more limited scope of this paper. The descriptions have been drawn largely from the same source, but as far as possible these have been verified for Ohio specimens, and modified as occasion demanded to make them apply more closely to the species as found in Ohio.

While it is not the purpose to discuss in this paper the general anatomy of the fish, such as may be found in any good laboratory guide on zoology, a few hints to the beginner in regard to methods of procedure and to some particular points of structure may here find a place. The teeth in some species are borne on nearly all parts of the mouth and pharynx—premaxillaries, maxillaries, mandibles, vomer, palatines, tongue, hyoid apparatus, pterygoids and pharyngeals, but may be wanting from any or all of them. The examination of all but the last mentioned can usually be satisfactorily made through the open mouth by using a blunt dissecting needle or the head of a pin as a "feeler." It is the determination of the number and arrange-

ment of the lower pharyngeal teeth that constitutes the particular "bête noire" of the uninitiated, but this must be mastered or many identifications will be impossible. The lower pharyngeal bones form the fifth pair of gill arches and usually bear teeth on their inner surfaces, and to examine these it is necessary to remove the bones. This is most easily done in the case of the minnows and other small species by lifting the opercle and inserting a small hook behind the gills. In the sunfish and suckers and other larger forms it is best to run a scalpel around them before attempting to remove them. The teeth when removed are usually covered, more or less, with broken tissues, which can be removed by cleaning carefully with a fine-pointed needle, or with a soft brush under water. In case the teeth have been broken off, as frequently happens, the bases can be distinguished. A good hand lens is essential. In native minnows the pharyngeal teeth are in one or two rows, and their number and arrangement is expressed by a formula—thus 1,4–4, 2, meaning that on one side the small, inner row consists of one tooth, and on the opposite of two, while the teeth of the outer row are the same on both sides. The fins are composed of stout spines, or soft rays or of both. In the fin formula the number of spines is expressed by Roman characters, and the rays by the Arabic figures. Thus the formula, "D. X, 14," indicates that the dorsal fin is composed of ten spines and fourteen rays. If the dorsal fin were in two parts the formula would read "D. X–14." In counting the number of rays the undeveloped rudimentary ones are not usually considered except in the case of the catfish. A little allowance may be made for variation in number of rays. In small specimens where the rays are not always easy to count, a good way to determine the number is to draw the point of a pin forward over the fin near the base of the rays. A good lens is also useful. The dorsal fin is usually referred to in descriptions as simply the dorsal, and other fins in like manner. They are further abbreviated by using D., A., C., V. and P. to stand for dorsal, anal, caudal, ventral and pectoral fins respectively. The scales are counted along the lateral line (a longitudinal row of scales each with a small pore in most fishes) from behind the opercle to the base of the caudal fin, and the transverse rows are counted from the front

of the dorsal fin to the lateral line and from the lateral line to the middle of the belly. Thus the formula, "6–45–4," means that there are forty-five scales in a longitudinal row, and that there are six rows above the lateral line and four below it. If the lateral line were absent the formula would read, "45–10." Variations, sometimes considerable, may be looked for in the scale formula. The gill membranes (free folds of skin below the opercles, supported by one or more branchiostegal rays) may be "connected," that is, united together in a fold below the "isthmus" or space between the throat and breast, they may be "joined to the isthmus" along their lower edges, or they may be "free" from the isthmus and from each other. The pre-maxillaries are "protractile" when they are separated in front from the skin of the forehead by a transverse groove, and "not protractile" when such transverse groove is incomplete or wanting. In some fishes, as in the bass and many sunfishes there is a "supplemental maxillary" bone lying along the upper side of the maxillary. In taking body measurements the depth is taken at the deepest place, and the head is measured from point of snout to the end of the opercle, except that in sunfishes the soft flap is not measured. Depth and length of head are compared with the length of the whole body exclusive of the caudal fin. Thus, "head 4" means that the length of the head is contained four times in the length of the body. The eye is measured to the full width of the orbit.

The writer desires to express his gratitude to the Department of Zoology of the Ohio State University for the use of a seine and other collecting apparatus, to Prof. Herbert Osborn for kindly advice and assistance in many ways, and to the Trustees of the Ohio State Academy of Science for pecuniary aid, through the Emerson McMillin fund, in carrying on the work of seining. Special acknowledgment is also due to Messrs. J. S. Hine, W. R. Rhoades, Chas. Carter, F. L. Landacre, J. H. Pumphrey, S. E. Rasor, Chas. Osburn, and others, who by kindly assistance in various ways have so materially aided in the pursuit of the work.

THE FISHES OF OHIO.*

A. Body long and slender, eel-like; skin smooth and slippery, wholly devoid of scales; no paired fins; no lower jaw; the mouth placed in or near the center of a large, circular and sucker-like disc; a single median nostril; skeleton cartilaginous.—
Class: MARSIPOBRANCHII (Cyclostomes).

AA. Body variously developed, scales usually but not always present; paired fins present; lower jaw always present; nostrils never median.—
Class: PISCES (True Fishes).

Class: MARSIPOBRANCHII.

Order: HYPEROARTII.

Family: PETROMYZONIDAE (Lampreys).

Key to Genera.

A. Sucker large, and furnished with numerous teeth which are in rows radiating from the mouth; horny plate above the mouth short and provided with 2 or 3 teeth, which are placed close together.— ICHTHYOMYZON.

AA. Sucker relatively small, and with few teeth; mouth overhung with a crescent-shaped, horny plate, which terminates at each end in a distinct tooth; tongue armed in front with a crescentic, serrated, horny plate.— LAMPETRA.

Genus: ICHTHYOMYZON.

Ichthyomyzon concolor (Kirtland). SILVER LAMPREY.

Sucking disk large, moderately fringed; teeth strong and nearly uniform; two teeth on supraoral plate; seven in the transverse row below mouth, the remaining teeth arranged in about four concentric circles. Dorsal fin arising midway from snout to end of tail, broadly notched, continuous with caudal; anal fin also continuous with caudal. About fifty-two muscular grooves between gills and vent. General color bluish, sometimes blotched with black; a dark blue spot above each gill opening. Length about 12 inches.

This species appears to be distributed throughout the state, though nowhere very common. It ascends small brooks in spring to breed. McCormick mentions finding females with ripe eggs on May 22, in Vermillion river. The breeding date must be considerably earlier in central Ohio, as Messrs. Parker, Williamson and the writer took young larvæ a couple of inches long in Big Jelloway creek, Knox County, during the latter part of May, 1898. On the same date a large larva seven inches long was taken, so the species must continue in the larval stage something

*It has been thought best to include here also the Lampreys (*Marsipobranchii*) of Ohio, for the reason that, in the popular idea, a lamprey is a "fish."

more than a year. One large larva, seven inches in length, showed the following colors: dull yellow, pigmented above with fine, brown specks, giving to the back a brownish cast; this is interrupted in the mid-dorsal line, leaving a yellow, vertebral line; fins yellowish, brightest at base. Young larvæ, two and one-half inches long, were light olive brown, with fine brown specks above; dark around base of anal fin. Eyes very slightly developed. The young larvæ were taken from a mass of sand and mud seined from the bottom of Sawmill Run.

The species was first taken by Dr. Kirtland in Big Miami river, and described by him. He afterward recorded it from the Mahoning and Scioto rivers. Vermillion river, McCormick, 1892; Big Jelloway creek, Parker, Williamson and Osburn, 1898; Henshall mentions one which passed through a hydrant in Cincinnati; and Dr. Jordan says, "I have obtained several specimens with Perch from Lake Erie, both external, feeding on the Perch, and internal, having been devoured by the fish."

Genus: LAMPETRA.

Lampetra wilderi (Gage). SMALL BLACK LAMPREY; BROOK LAMPREY.

Sucking disk smaller than in the preceding, the fringes longer. Dorsal fin arising midway from snout to end of tail, not continuous with caudal except during breeding season, when it is deeply notched. Below the mouth is a transverse row of blunt, horny teeth, 5 to 9 in number. On each side of the disk is a plate with three bicuspid teeth; supraoral plate with a tooth at either end; remaining teeth few and weak. About 65 muscular grooves between gills and vent. Color bluish black, lighter on disk and belly. Length 6 to 9 inches.

Although from its range we might expect this species to occur throughout the state, it has, I believe, been recorded for but one locality. Mr. J. B. Parker has observed it to be common on the ripples of small tributaries of Big Jelloway creek, in Knox County, about the middle of April. Four specimens were captured at one dip of an insect net, and specimens taken by him are in the State University collection. The *Ammocœtes bicolor*, or Blind Lamprey, which Kirtland records from the Mahoning river may have been the larva of either this or the preceding species, as the immature forms are so similar as to be almost indistinguishable.

Class : PISCES.

Sub-Class: TELEOSTOMI (True Fishes).

Artificial Key to the Families of Fishes.

I. VENTRAL FINS PRESENT—ABDOMINAL.

A. Back with an adipose fin behind the single, rayed dorsal fin.
  B. Head with barbels about mouth and nostrils, body scaleless; a single spine in each pectoral and in dorsal fin.— SILURIDÆ.
  BB. Head without barbels; body scaled.
    C. Dorsal, anal and ventral fins each with a small but distinct spine; scales ctenoid.— PERCOPSIDÆ.
    CC. Dorsal, anal, and ventrals without distinct spine; scales not ctenoid.— SALMONIDÆ.

AA. Back without adipose fin.
  D. Dorsal fin single, composed of rays, and not preceded by a series of free spines.
    E. Tail evidently strongly heterocercal.
      F. Body naked; snout with a spatulate blade; mouth wide, without barbels.— POLYODONTIDÆ.
      FF. Body with scales or bony plates or shields.
        G. Body with 5 series of bony shields; mouth inferior, toothless, preceded by four barbels.— ACIPENSERIDÆ.
        GG. Body scaly.
          H. Scales cycloid; a broad, bony, gular plate; dorsal fin many rayed.— AMIIDÆ.
          HH. Scales ganoid; no gular plate; dorsal fin short.— LEPISOSTEIDÆ.
    EE. Tail not evidently heterocercal.
      I. Gill membranes broadly joined to the isthmus; head naked; no teeth in jaws.
        J. Lower pharyngeal teeth very numerous, in one row like the teeth of a comb.— CATOSTOMIDÆ.
        JJ. Lower pharyngeal teeth few, fewer than 8, in 1 to 3 rows.— CYPRINIDÆ.
      II. Gill membranes free, not attached to the isthmus.
        K. Head scaly, more or less.
          L. Upper jaw not protractile, its lateral margins formed by the maxillaries.
            M. Jaws depressed, prolonged; lateral line present.— LUCIIDÆ.
            MM. Jaws short; no lateral line.— UMBRIDÆ.
          LL. Upper jaw protractile, its margin formed by premaxillaries alone; no lateral line.— POECILIIDÆ.
        KK. Head naked.
          N. Lateral line well developed; mouth large, teeth all pointed, some of them canine.— HIODONTIDÆ.
          NN. Lateral line wanting.
            O. Mouth small, inferior, toothless; stomach gizzard-like.— DOROSOMATIDÆ.
            OO. Mouth moderate, terminal; stomach not gizzard-like.— CLUPEIDÆ.

DD. Dorsal fin not as in D.
P. Dorsal fin single, preceded by free spines; body scaleless.—
GASTEROSTEIDÆ.
PP. Dorsal fins, two; the first small, composed entirely of spines; body very slender, covered with scales.— ATHERINIDÆ.

II. VENTRAL FINS PRESENT—THORACIC OR SUB-JUGULAR.

A. Body covered with scales.
B. Rays of the ventral fins, I, 5.
C. Lateral line extending on caudal fin to tip of middle rays.—SCIAENIDÆ.
CC. Lateral line not extending beyond base of caudal fin.
D. Pseudobranchiæ or false gills on under side of opercles well developed; head scaled forward to between nostrils.—SERRANIDÆ.
DD. Pseudobranchiæ wanting or covered by skin.
E. Anal spines, 3 to 10; body more or less deep and compressed.—
CENTRARCHIDÆ.
EE. Anal spines, 1 or 2; body usually elongate.— PERCIDÆ.
BB. Rays of the ventral fins not I, 5.
F. Dorsal fin single, with 3 or 4 spines.— APHREDODERIDÆ.
FF. Dorsal fin divided into 2 distinct parts, spines wanting.— GADIDÆ.
AA. Body naked; dorsal fin with 6 or 7 spines.— COTTIDÆ.

III. VENTRAL FINS ENTIRELY WANTING.

A. Body long and snake-like; skin covered with long imbedded scales at right angles to each other; lower jaw projecting.— ANGUILLIDÆ.

Series: GANOIDEI.

CHONDROGANOIDEA (THE CARTILAGINOUS GANOIDS).

Order: SELACHOSTOMI.

Family: POLYODONTIDÆ.

Genus: POLYODON.

Polyodon spathula (Walbaum). PADDLE-FISH; SPOON-BILL CAT.

A very peculiar looking fish, recognizable at once by its long, paddle-shaped snout, which is about ⅓ the length of the body and is thin and flexible. The eyes are small and placed near the base of the snout; opercular flap long, reaching back as far as to the ventral fins. Caudal fin large, forked, the lobes about equal. Color olivaceous, paler below. This singular fish attains a length of 5 or 6 feet, but is of little or no economic importance.

Taken in the Ohio and Muskingum rivers, Kirtland; "one was taken in a pound net (in Lake Erie) near Vermillion in 1874," McCormick; "common in the Ohio river," Henshall, 1888.

Order: CHONDROSTEI.

Family: ACIPENSERIDÆ.

Key to Genera.

A. Spiracles present; snout subconic; rows of bony shields distinct throughout; the tail not depressed nor mailed.— ACIPENSER.

AA. Spiracles obsolete; snout subspatulate; rows of bony shields confluent behind dorsal so that the depressed tail is completely mailed.— SCAPHIRHYNCHUS.

Genus: ACIPENSER.

Acipenser rubicundus Le Sueur. LAKE STURGEON; OHIO STURGEON; ROCK STURGEON.

Body elongate, terete, tapering towards snout and tail. Snout long and slender in young, becoming more blunt with age. Body covered with large, rough, strongly hooked shields, which become smoother with age. Color dark olive above, sides paler or reddish, with sometimes irregular dark spots. Length 6 feet.

This species occurs both in Lake Erie and the Ohio river. Those from the Ohio, formerly considered as belonging to a separate species, *A. maculosus*, are now regarded as the young of *A. rubicundus*. "The Ohio river as far as Pittsburg," Rafinesque (Rafinesque made six species out of this and *Scaphirhynchus platorynchus*, which he included in the same genus); Lake Erie and Ohio river, Kirtland; Lorain County, very common, McCormick, 1892; abundant in the Ohio river, Henshall, 1888; Lake Erie (west end), Kirsch, 1893.

Genus: SCAPHIRHYNCHUS.

Scaphirhynchus platorynchus (Rafinesque). SHOVELNOSE STURGEON.

Body slender, head broad, becoming suddenly broader just behind the eyes. Snout flat and pointed. The body tapers gradually backward from the head to the tail, the upper lobe of which ends in a long, slender filament. Body protected by five rows of bony shields, which are keeled and hooked. Color olive, paler below. Length 5 feet.

"Very common in the Ohio, but seldom reaching as high as Pittsburg," Rafinesque; "common in the waters of the Ohio," Kirtland; "common in the Ohio," Henshall, 1888.

HOLOSTEI (The Bony Ganoids).

Order: RHOMBOGANOIDEA.

Family: Lepisosteidæ.

Genus: Lepisosteus.

Key to Species.

A. Large teeth of upper jaw in 1 row on each side.
  B. Beak long and slender, snout more than twice the length of head.— *osseus.*
  BB. Beak shorter and broader, little longer than the rest of the head.—*platostomus.*
AA. Large teeth of upper jaw in 2 rows on each side; beak short and broad, not longer than rest of head.— *tristœchus.*

Lepisosteus osseus (Linnaeus). Common Gar Pike; Billfish; Gar.

Snout at least twice as long as the rest of the head, and quite slender, its least width being contained 15 or 20 times in its length. Color olivaceous above, paler below. Young with round, black spots on vertical fins and posterior part of body, these becoming less distinct with age. Very young with black, lateral band. Length 5 feet.

A voracious, good-for-nothing fish, but interesting to the naturalist on account of its structure and habits. A common and widely distributed species, being found in Lake Erie and Ohio river, and in all the larger streams of the state. They are very common in the Scioto river below Columbus, where the river in summer is rotten with filth from the sewers of the city. They have a peculiar habit of lying motionless in schools at the top of the water. Dr. Kirtland records the species for the state as "found in most of the larger tributaries of the Ohio;" Lorain County, Lake and lower part of larger streams," McCormick, 1892; Ohio river and Lake Erie, Henshall, 1889; Maumee river, Blanchard river, Auglaize river, Hoaglin creek and Beaver creek, Kirsch, 1893; Scioto river at Columbus, Williamson and Osburn, 1897; Ohio river at Ironton, John's Creek at Waterloo, Huron river at Milan, and Sandusky Bay, R. C. Osburn, 1899; Ohio River at Bellaire, R. C. Osburn, 1900.

Lepisosteus platostomus Rafinesque. Short-nosed Gar.

Distinguished from *L. osseus* chiefly by the snout, which is only a little longer than the rest of the head—never more than 1¾ times the length of

the head. The snout is also comparatively broader than in *L. osseus*, its least width being contained only 5 or 6 times in its length. Coloration much as in *L. osseus*.

Rare in Lake Erie and its tributaries, more common in the Ohio and its tributary rivers. Ohio, Miami and Scioto rivers, Rafinesque; Maumee river at Toledo, "a single specimen," Kirsch, 1893; Lorain county, "very rare," McCormick, 1892; Sandusky Bay, one specimen, and Ohio river at Ironton, R. C. Osburn, 1899.

Lepisosteus tristœchus (Bloch and Schneider). ALLIGATOR GAR.

Snout shorter than in either of the preceding members of this genus, being usually shorter than the head. It is also comparatively much broader, its least width being contained in its length 3½ times. Length 8 or 10 feet. "A huge, muscular, voracious fish, useless as food, remarkable for its armature of enameled scales."

This species is included on the authority of Dr. Kirtland, who says (Rept. on the Zool. of Ohio, 1838): "A specimen is to be seen in the Cincinnati Museum, said to have been taken within the bounds of our state." Jordan and Evermann (Bull. 47, U. S. Natl. Mus.) give its range as far as Cincinnati, whether on added evidence I do not know.

Order: CYCLOGANOIDEA.

Family: AMIIDÆ.

Genus: AMIA.

Amia calva Linnaeus. DOGFISH; BOWFIN; GRINDLE.

Head 3¾ in length; depth 4 to 4½; D. 48; A. 10 to 12; V. 7; scales in lateral line 67; lateral line nearly median, directed slightly upward at either end. Color dark olive or blackish, paler below; lower jaw usually with round, dark spots; fins somewhat mottled. Male with a round, black spot at base of caudal above, surrounded by a yellowish or orange shade. Length, male 18 inches; female 2 feet.

Lake Erie, Kirtland; Lake Erie and Ohio river, Jordan; Lorain County, "Rare, once in a great while one is brought in from the pounds, and I have taken one in Black river," McCormick, 1892; Lake Erie, Henshall; one specimen from the Maumee river at Toledo, Kirsch, 1893; Huron river and Sandusky Bay, R. C. Osburn, 1899.

Series: TELEOSTEI.

Order: NEMATOGNATHI.

Family: SILURIDÆ (The Catfishes).

Key to Genera.

A. Adipose fin, with its posterior margin free.
  B. Premaxillary band of teeth truncate behind; not produced backward at the outer angles.
    C. Supraoccipital bone continued backward from the nape, its notched tip receiving the bone at base of dorsal spine, so that a continuous bony bridge is formed under the skin; caudal fin forked.— ICTALURUS.
    CC. Supraoccipital not reaching as far as dorsal fin, the bony bridge more or less incomplete.— AMEIURUS.
  BB. Premaxillary band of teeth with a lateral backward extension on each side; lower jaw projecting.— LEPTOPS.
AA. Adipose fin keel-like, adnate to the back.
  B. Band of teeth in upper jaw, with a backward extension at its outer posterior angle as in *Leptops*.— NOTURUS.
  BB. Band of teeth in upper jaw without backward extension, as in *Ameiurus*.— SCHILBEODES.

Genus: ICTALURUS.

Key to Species.

A. Anal fin very long, its rays 32 to 35.— *furcatus.*
AA. Anal fin shorter, its rays about 26.— *punctatus.*

Ictalurus furcatus (Le Sueur). CHUCKLE-HEADED CAT.

Head 4½; depth 4 in adults to 5½ in young. Anal fin long, of 32 to 35 rays. Eye small, wholly anterior, the middle of the head being behind its posterior margin. Humeral spine not reaching middle of pectoral spine. Color silvery, sometimes spotted with darker. Sometimes reaching a weight of over 40 pounds.

"I have seen one or two specimens taken at Cincinnati," Jordan; "common in the Ohio river," Henshall, 1888. Not recorded elsewhere in the State.

Ictalurus punctatus (Rafinesque). CHANNEL CAT; BLUE CAT; WHITE CAT; LADY CAT.

Head 4; depth 5; anal fin of 25 to 30 rays, usually 27 in Ohio specimens. Eye large, the middle point of the length of the head being near its posterior margin. Barbels long, those of the maxillary reaching beyond gill opening. Humeral process long, more than ½ the length of pectoral spine. Color light olivaceous, becoming silvery or pale on sides and belly; the sides usually with distinct round, dark spots, these becoming less distinct with age. Young specimens usually have a gaunt, faded-out, "consumptive" look. It reaches a weight of about 25 pounds.

Distributed throughout the state, but more abundant in the Ohio and tributaries. Rafinesque records it under the name *Pimelodus* (*Silurus*) *maculatus*, "as far as Pittsburg." Kirtland mentions it under the name *Pimelobus coerulescens*, as "common to the Ohio and lake waters," and as *P. pallidus*, "common in the Ohio at Cincinnati." The latter is identical with the former. Abundant in Ohio and Little Miami rivers, Henshall, 1888; Lorain County, common, McCormick, 1892; Maumee river at Toledo and Grand Rapids, Kirsch, 1893; Muskingum river at McConnellsville, Prof. D. S. Kellicott, 1895; Franklin County, "common in all larger streams, especially in Big Walnut creek," Williamson and Osburn, 1897; Ohio river and Ice creek at Ironton, Wabash river at Celina, R. C. Osburn, 1899; Chippewa lake, Ohio river at Bellaire, R. C. Osburn, 1900.

Genus: AMEIURUS.

Key to Species.

A. Caudal fin forked.— *lacustris*
AA. Caudal fin not forked.
  B. Anal fin long, of 24 to 27 rays (counting rudiments).— *natalis.*
  BB. Anal fin shorter, of 17 to 22 rays.
    C. Lower jaw projecting. Anal rays 20.— *vulgaris.*
    CC. Lower jaw not projecting.
      D. Pectoral spines long, 2 to 2½ in head; anal rays 20 to 23.—*nebulosus.*
      DD. Pectoral spines shorter, 2½ to 3 in head; anal rays 17 to 19.—*melas.*

Ameiurus lacustris (Walbaum). MISSISSIPPI CAT; GREAT FORK-TAILED CAT.

Head 4, low, broad and depressed, its upper surface quite flat, its width $\frac{5}{6}$ its length. Depth 5; D. I–5; A. 25 to 32, base of the fin as long as head. Humeral process short, only a little over $\frac{1}{3}$ the length of pectoral spine. Body stouter than in the preceding genus. Caudal fin deeply forked. Color dark olivaceous or slate, growing darker with age; belly pale, no dark spots on sides. Our largest catfish, said to reach a weight of 150 pounds or more.

In Ohio this species is well distributed, being found in the lake, Ohio river and larger streams. Kirtland does not record this species, probably confusing it with his *Pimelobus coerulescens* (*Ictalurus punctatus*). Common in the Ohio river, Henshall, 1888; Lorain County, common in the lake and lower parts of the rivers, McCormick, 1892; Franklin County, two specimens taken in Big Darby creek; one of these, a female weighing 4½ pounds, contained eggs, June 21, 1897, Williamson and Osburn.

Ameiurus natalis (Le Sueur). YELLOW CAT.

Head broad and short; upper jaw slightly projecting. Body stoutish; the back low, not arched. Anal fin long, its base contained in length of body 3½ to 3¼ times; its rays 24 to 27. Color usually brownish or yellowish, sometimes black; belly pale or yellowish. Length about a foot. Ohio specimens seem to fall into the nominal variety *cupreus*, as indicated by the longer upper jaw.

This is a common species in most parts of Ohio, occurring in nearly all streams and lakes. "The yellow catfish I have only seen in the Cincinnati markets, where it is comparatively rare," Kirtland; Lake Erie, Henshall, 1889; Lorain County, "common in the ponds, streams and lake," McCormick, 1892; Maumee river at Antwerp, Defiance, Grand Rapids and Waterville, Tiffin river at Brunersburg, Sugar creek at Lima, Lost creek at Lima, Blanchard river at Findlay and Ottawa, Beaver creek at Grand Rapids, "seemingly scarce at all of these points," Kirsch, 1893; Franklin County, Scioto river, Olentangy river, Big Walnut, Little Walnut and Darby creeks, and Hell Branch, Williamson and Osburn, 1897; Ohio river at Ironton, John's creek at Waterloo, Huron river at Milan, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks at Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Chippewa lake, Summit lake, Licking reservoir, R. C. Osburn, 1900.

Ameiurus vulgaris (Thompson). LONG-JAWED CATFISH.

Head 3½ to 4, a little longer than broad, considerably narrowed forward when viewed from above, lower jaw distinctly projecting. Body somewhat elongate and compressed, the back somewhat elevated. Anal rays 20. Color dark brownish or black, becoming white rather abruptly on the belly. Length 18 inches.

The Long Jawed Catfish is not common in Ohio, but seems to be widely distributed. Jordan mentions it as "taken in Lake Erie and occasionally in the Ohio"; Henshall in 1889 records it for Lake Erie; Lorain County, "Martin's run, only one recorded," McCormick, 1892; two specimens from the Ohio canal at Columbus, Williamson and Osburn, 1897; Pippin lake, R. C. Osburn, 1900.

Ameiurus nebulosus (Le Sueur). COMMON BULL-HEAD; HORNED POUT.

Head broad and flattened, upper jaw noticeably the longer. Body rather elongate, depth 4 to 4½. Anal fin with 20 to 22 rays, its base contained 4 times in length of body. Humeral process more than ½ the length of the rather long pectoral spine. Color dark brown or brownish yellow, usually somewhat clouded, sometimes nearly black. Length 18 inches.

A very common species in the lake and its tributaries, less common in the Ohio river drainage, but found in all larger streams. "Occasionally seen in the Cincinnati markets," Kirtland; Lake Erie, Henshall, 1889; Lorain County, "common in all streams," McCormick, 1892; Maumee river at Cecil and Waterville, Fish creek at Edgerton, St. Mary's river at St. Mary's, Gordon and Lost creeks near Cecil, Tiffin river at West Unity and Brunersburg, Auglaize river at Wapakoneta, Cloverdale, Oakwood and Defiance, Sugar creek at Cloverdale and Lima, Lost creek at Lima, Blanchard river at Findlay and Cloverdale, Hoaglin creek at Oakland, Kirsch, 1893; Franklin County, Scioto river, Olentangy river, Mason's run, Big Walnut, Little Walnut, Big Darby and Alum creeks, Williamson & Osburn, 1897; Huron river at Milan, Sandusky Bay, Ashtabula creek at Ashtabula, R. C. Osburn, 1899; Pippin lake, Summit lake, R. C. Osburn, 1900.

Ameiurus melas (Rafinesque). BLACK BULL-HEAD.

Body stout, short and deep, back high, the profile nearly straight to base of dorsal fin. Head broad, rounded in front, jaws about equal. Pectoral spine short, its length contained 2½ to 3 times in length of head. Anal fin short and deep, its base 4½ to 5 in length of body, rays 17 to 19, the light colored rays contrasting sharply with the dark membranes. Color almost black, sometimes brownish or yellowish, the belly pale or yellowish. This species shares with the three next preceding the name of Bull-head, the ordinary fisherman not drawing very fine distinctions in regard to species.

The Black Bull-head is the most abundant species of catfish in the state, found in nearly all streams and ponds of whatever size, and especially in the Ohio river drainage. It is less abundant in the lake drainage. It is a mud loving species and is less likely to be found in clear, swift streams than in muddy, stagnant bayous. *A. xanthocephalus* Rafinesque is now recorded as synonymous

with *A. melas*. Recorded by Kirtland as *A. xanthocephalus*, and by Jordan as *A. melas* and *xanthocephalus*. "Very common in Ohio and Little Miami rivers and Mill creek," Henshall, 1888; Lorain County, "common in all streams and ponds," McCormick, 1892; Maumee river at Cecil and St. Mary's river at Rockford, Kirsch, 1893; Franklin County, in nearly all streams, Williamson and Osburn, 1897; Big Jelloway creek at Howard, Parker, Williamson and Osburn, 1898; Ohio river at Ironton, Huron river at Milan, Wabash river at Celina, Stillwater and Wolf creeks at Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Sandusky, Prof. D. S. Kellicott, Williamson and Osburn, 1896; Niggermill run at Salem, E. B. Williamson, 1900; Sandusky bay at "Black Channel," Breakneck creek and Cuyahoga river near Kent, and Licking reservoir, R. C. Osburn, 1900; June 22 is given as a breeding date by Williamson and Osburn.

Genus: LEPTOPS.

Leptops olivaris (Rafinesque). MUD CAT.

Body slender, depressed forward, the head extremely flat, the lower jaw the longer. Dorsal spine very weak, only ½ the height of the fin; caudal fin slightly emarginate; anal short, its base about ⅛ the length of body, its rays 12 to 15. Yellowish, much mottled with brown and greenish, whitish below. Size large, reaching a weight of 50 to 75 pounds.

Jordan says, "This species abounds in the Ohio river and its larger tributaries," but it is probably common nowhere in Ohio except in the southwestern part of the state. Henshall records it for White Oak creek and the Ohio river, 1889; and in 1892 McCormick mentions the occurrence in Lake Erie, Lorain County, as "quite rare; I have seen but one specimen fresh, though I have noticed heads on the beach."

Genus: NOTURUS.

Noturus flavus Rafinesque. YELLOW STONE CAT.

Head broad and flat, much depressed, 4 in length of body. Body terete, tail compressed. Soft dorsal fin keel-like, separated from caudal by a deep notch. Dorsal spine very short, only ½ as long as pectoral spine; caudal rounded; anal short, its rays about 16. Brownish yellow, varying into bluish or blackish. Length 1 foot.

Widely distributed and generally common in suitable localities. It is found most abundantly on stony ripples of the larger streams, and on sandy and gravelly bottoms of rivers and lakes. "Occasionally found beneath stones in the Mahoning river," Kirtland; "much more abundant in the Ohio and its immediate tributaries than in the streams of the interior," Jordan; "abundant in Little Miami river, Mill creek and nearly all streams" (Hamilton County), Henshall, 1888; Lorain County, "larger streams and the lake," McCormick. 1892; Maumee river at Defiance, Grand Rapids and Waterville, Fish creek at Edgerton, St. Mary's river at Rockford, Auglaize river at Cloverdale and Defiance, Blanchard river at Ottawa, Hoaglin creek at Oakland, and Blanchard river and Sugar creek at Cloverdale, Kirsch, 1893; Franklin County, "abundant in all larger streams, Scioto and Olentangy rivers, Big Walnut, Little Walnut, Alum, Big and Little Darby creeks, Black Lick and Hell Branch," Williamson and Osburn, 1897; Knox County, Big Jelloway creek, Parker, Williamson and Osburn, 1898; John's creek at Waterloo, Huron river at Milan, North Fork of Licking river at Newark, R. C. Osburn, 1899; Lake Erie at Sandusky, frequently thrown up dead on the beach by the waves; not noticed in Sandusky bay, Wheeling creek at Bridgeport, Ohio river at Bellaire, R. C. Osburn, 1900.

Genus: SCHILBEODES.

Key to Species.

A. Pectoral spine entire or grooved behind, never retrorsely serrate; adipose fin high and continuous, not separated by a notch from the caudal.— *gyrinus.*

AA. Pectoral spine distinctly serrate behind.

B. Adipose fin nearly or quite free from caudal; color nearly plain brownish, saddle-like blotches faint, everywhere pigmented with fine dots; anterior edge of pectoral spine retrorsely serrate.— *e'eutherus.*

BB. Adipose fin not quite free from caudal; color much variegated, back with distinct saddle-like blotches; pectoral spine strong, its anterior edge with few serrations.— *miurus.*

Schilbeodes gyrinus (Mitchill). CHUBBY STONE CAT; TADPOLE CAT.

Head large, broad and depressed, 3½ to 4 in length; mouth wide, jaws about equal. Body short and stout, pot-bellied, shaped much like a tadpole. Caudal peduncle comparatively long and compressed. Pectoral spine not serrated behind, but grooved instead. Anal fin with 13 rays. Soft dorsal

continuous with caudal, scarcely notched. Color yellowish brown or brownish olive, nearly uniform ; a distinct narrow, black line along lateral line. Length 5 inches.

Rather irregularly distributed, but common in suitable localities. Dr. Jordan (Ohio Rept.) says of this species and *S. miurus* that "their habits are similar, they are usually found together and are about equally abundant in Ohio," but in the writer's experience *S. miurus* has been found much more generally distributed, occurring in the open water of streams, usually on gravelly or stony bottom, while *gyrinus* seems to prefer the quiet of lakes and ponds, and in the course of several years collecting the two species have never been taken together. *S. gyrinus* was observed by Prof. D. S. Kellicott, Mr. E. B. Williamson and the writer to be common among the decaying vegetation in shallow water in Sandusky Bay in 1896 ; "Ross lake," Henshall, 1889 ; Lorain County, "Common on mud banks in the lower parts of streams entering the lake," McCormick, 1892; Maumee river at Toledo, St. Mary's river at St. Mary's, "everywhere scarce," Kirsch, 1893 ; Franklin County, Mason's run and Big Darby creek, rare, Williamson and Osburn, 1897 ; Sandusky Bay, R. C. Osburn, 1899 ; Summit lake, Licking reservoir, R. C. Osburn, 1900.

Schilbeodes eleutherus (Jordan).

Head broad and flat, much depressed, narrowed anteriorly, 3¾ in body ; upper jaw much longer than the lower, which is included. Body much of the same form as that of *S. miurus*, but with the back somewhat higher ; depth 4½ in length. Soft dorsal free from caudal, or only very slightly connected. Color nearly uniform brown above, lighter below, flecked everywhere except on middle of belly, with black dots. Distinguished from *S. miurus*, which it most nearly resembles, by the free adipose fin, the longer upper jaw and the absence of distinct, black, saddle-like blotches on the back. Length 4 inches.

I know of but one specimen of this very rare species taken within the limits of the state. This was taken in Big Walnut creek, Franklin County, by Mr. E. B. Williamson and the writer, June 25, 1897.

Schilbeodes miurus (Jordan). CROSS-BARRED STONE CAT.

Head very much depressed, rounded anteriorly, 3¾ in length; upper jaw longer but not so much so as in the preceding species. Depth about 5 in length; back scarcely elevated; adipose fin connected with caudal, but more or less deeply notched. Conspicuously mottled with gray and blackish, with 3 or 4 definite black blotches across the back. Length, 4 inches.

A rather common and widely distributed species. Ohio river at Raccoon I., Henshall, 1889; Lorain County, quite rare, Vermillion and Black rivers, McCormick, 1892; Maumee river at Antwerp, St. Joseph river at Edgerton, St. Mary's river at Rockford, Tiffin river at West Unity and Brunersburg, and Auglaize river at Cloverdale, Oakwood and Defiance, "In an old mill race which empties into Tiffin river near West Unity large numbers were caught, common in Hoaglin creek near Oakwood, rather scarce at all other points," Kirsch, 1893; Franklin County, generally common, abundant in Big Walnut, taken also in Scioto river, Olentangy river, Black Lick, Little Walnut, Big Darby and Alum creeks, Williamson and Osburn, 1897; Ohio river at Ironton, John's creek at Waterloo, Sandusky Bay, Ashtabula creek at Ashtabula, Wabash river at Celina, North Fork of Licking river at Newark, R. C. Osburn, 1899; Ohio river at Bellaire, R. C. Osburn, 1900. Females were observed with ripe eggs from June 25 to July 6, 1897, by Mr. Williamson and the writer.

Order: PLECTOSPONDYLI.

Sub-Order: EVENTOGNATHI.

Family: CATOSTOMIDÆ (The Suckers).

Key to Genera.

A. Dorsal fin elongate, developed rays 25 to 50, air bladder in 2 parts.
  B. Fontanelle present, body ovate, scales large.
    C. Mouth large, more or less terminal, protractile forward; pharyngeal bones and teeth moderate, large species of dark color.— ICTIOBUS.
    CC. Mouth smaller, inferior, protractile downward; pharyngeal bones narrow, the teeth thin and weak; smaller species, pale in color.— CARPIODES.
  BB. Fontanelle obliterated by union of parietal bones; body elongate; scales rather small; lips thick and papillose.— CYCLEPTUS.
AA. Dorsal fin short, 10 to 18 developed rays.
  D. Air bladder in 2 parts.
    E. Lateral line present, complete and continuous; scales small, more than 50 in lateral line.— CATOSTOMUS.
    EE. Lateral line interrupted or wanting, scales large, less than 50 in lat. line.
      F. Lateral line entirely wanting.— ERIMYZON.
      FF. Lateral line more or less developed, especially in the adult.— MINYTREMA.
  DD. Air bladder in 3 parts; scales large; lateral line complete.
    G. Mouth normal, the lower lip entire or merely lobed, the upper lip protractile.
      H. Pharyngeal bones moderate, the teeth compressed, not molar-like, increasing in size gradually downward.— MOXOSTOMA.
      HH. Pharyngeal bones very strong, the lower teeth very much enlarged, cylindrical and truncate, molar-like.— PLACOPHARYNX.
    GG. Mouth singular, the upper lip not protractile, greatly enlarged, the lower lip developed as two separate lobes.— LAGOCHILA.

Genus: ICTIOBUS.

Key to Species.

A. Mouth large, terminal, protractile forward; lips very thin, lower pharyngeals and teeth weak.— *cyprinella.*
AA. Mouth smaller, more or less inferior, and with thicker lips; pharyngeal bones stronger; the teeth comparatively coarse and large.
  B. Back scarcely elevated, depth 3 to 3¼ in length.— *urus.*
  BB. Back elevated and compressed, depth 2½ to 2¾.— *bubalus.*

Ictiobus cyprinella (Cuvier and Valenciennes). COMMON BUFFALO FISH; RED-MOUTHED BUFFALO.

Head very large and thick, 3½ in length; depth 2½ to 3½. Developed rays of dorsal fin 27 to 29; anal 9; ventrals 10. Scales 7–37 to 41–6. Body robust, moderately compressed, the outline somewhat elliptical, but the back rather more curved than the belly. Opercular apparatus very strong, the operculum forming nearly ½ the length of the head. Color dull brownish olive, not silvery, fins dusky. Length nearly 3 feet.

According to Jordan, the Red-mouthed Buffalo Fish abounds in the Ohio river and its larger tributaries, and Henshall reports it "very common in Ohio river." Not reported for any other locality.

Ictiobus urus (Agassiz). MONGREL BUFFALO; RAZOR-BACKED BUFFALO.

Head very stout, strongly transversely convex, thicker, larger and less pointed than in *I. bubalus*, about 4 in length. Eye about equal to snout, 5½ in head, much smaller than in *I. bubalus*. Mouth large, considerably oblique, approaching that of *I. cyprinella*. Body much less elevated and compressed than in *I. bubalus*, the back not at all carinated; 3 to 3¼ in length. D. 30; A. 10; scales 8–41–7. Longest ray of dorsal scarcely ½ the length of base of fin; anal rounded. Colors very dark, fins all black. "Not always separable from *I. cyprinella*, and perhaps not really different."

Ohio river at Cincinnati, Henshall, 1889. Not mentioned by any other collector.

Ictiobus bubalus (Rafinesque). BUFFALO FISH; SMALL-MOUTHED BUFFALO; RAZOR-BACK; SUCKER-MOUTHED BUFFALO.

Head moderate, triangular in outline when viewed from the side, 4 in length, mouth quite small. Body considerably elevated and compressed above; the dorsal region sub-carinate, the belly thicker; depth 2¼ to 2¾. Highest dorsal ray reaching much beyond middle of fin; D. 29; A. 10; V. 10; scales 8–39–6. Color brownish olive, paler below, the lower fins slightly dusky. Length 30 inches.

Recorded by Rafinesque for the Ohio, "as far as Pittsburg." Also recorded for the state by Kirtland. "Abundant in the Ohio river," Henshall, 1888. Not recorded for any other point of the state.

Genus: CARPIODES.

Key to Species.

A. Body sub-fusiform, depth about 3 in length. Dorsal with about 30 rays.— *carpio.*
AA. Body ovate oblong, the back elevated, depth about 2½ in length.
  B. Lips thin, silvery white, the halves meeting in a wide angle.
    C. Head large, snout blunt; eye large, 3½ to 4.— *difformis.*
    CC. Head small and pointed, the snout projecting, eye small, 5 to 5½ in head.— *thompsoni.*
  BB. Lips full, thick, reddish in life, the halves of lower lip meeting in an acute angle.— *velifer.*

Carpiodes carpio (Rafinesque). BIG CARP SUCKER.

Head comparatively short, 4 to 5 in body. Body more fusiform than in others of the genus, compressed, but not much arched, depth 2⅔ to 3.

Anterior rays of dorsal short, much thickened and osseus at base, especially in adults, the longest ray a little more than ½ the base of the fin, which consists of 30 rays; caudal moderately forked. Eye medium, anterior, 4½ in head. Muzzle short, but projecting beyond mouth. 36 scales in lateral line.

Limited in its distribution to the Ohio and its larger tributaries. "The commonest species of its genus in the Ohio river, and it is often found in the streams of the interior," Jordan. Very abundant in the Ohio river, Henshall, 1888; Ohio river at Bellaire, R. C. Osburn, 1900.

Carpiodes difformis Cope.

Snout very blunt, the maxillary reaching to front of pupil. Nostrils very near tip of snout. Lips thin, silvery colored in life, the lower ∩-shaped. Head 4¼ in body; depth 2¼ to 2¾, the back considerably elevated. Eye quite large, 3½ to 4 in head. D. 24, its first rays very high; A. 8; V. 9; scales, 6-35-4.

Recorded for the state by Jordan, under the name of *C. cutisanserinus* (Cope), as "abundant in the Ohio." *C. cutisanserinus* is now regarded as identical with *C. difformis*. "Abundant in Ohio river, young common in Little Miami river," Henshall, 1888. Klippart, in his first report, says of this species, that it "abounds in Lake Erie, but this must be a mistake, probably in regard to the species, as *C. difformis* is not, I believe, known to occur in the St. Lawrence System."

Carpiodes thompsoni Agassiz. LAKE CARP.

Body stout, short, the back much elevated, depth 2½ in length. Head small, 4 to 4½ in length, the snout pointed; lips thin, white, meeting at a wide angle. Eye small, 5 to 5½ in head. Tip of lower jaw much in advance of nostrils; maxillary reaching line of orbit. Dorsal of about 27 rays, arising about midway from snout to base of caudal, its anterior rays high, ⅔ as long as base of fin. A. 7; V. 10; scales rather closely imbricated, 8-39 to 40-6.

"Abundant in Lake Erie. I have examined many specimens from Sandusky Bay," Jordan; Lake Erie, Henshall, 1889; Lorain County, "not very common," McCormick, 1892; Lake Erie at Toledo, Jordan and Evermann (Bull. 47, U. S. Nat'l. Mus.).

Carpiodes velifer (Rafinesque). QUILL BACK; SPEARFISH.

Head 3¾ to 4; lips thick, full, flesh-colored in life, the halves of the lower meeting at an acute angle; muzzle projecting, conic; eye 4 to 5 in head. Back much arched; depth 2½ to 3. Dorsal fin of about 27 rays, the anterior rays very long and filamentous, sometimes as long as the base of the fin. Caudal deeply forked, its lobes slender, the upper lobe the longer. Scales 7–35–5.

Recorded by Rafinesque for the Ohio river as far as Pittsburg. "Quite common in Ohio river, young ones common in Little Miami river and tributaries," Henshall, 1888; Maumee river at Antwerp, Defiance, Grand Rapids and Toledo, Tiffin river at Brunersburg, Auglaize river at Cloverdale, Oakwood and Defiance, Blanchard river at Ottawa and Cloverdale, Hoaglin creek near Oakland, Beaver creek at Grand Rapids, "rather common at all these points," Kirsch, 1893; Scioto river, Scioto Big Run, Mason's Run and Hell Branch, Williamson and Osburn, 1897; Scioto river at Ironton, Wabash river at Celina, Wolf creek near Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Breakneck creek and Cuyahoga river near Kent, Chippewa lake, Wheeling creek at Bridgeport, Ohio river and McMahon's Run at Bellaire, R. C. Osburn, 1900.

Cycleptus elongatus (Le Sueur). BLACK HORSE; MISSOURI SUCKER.

Depth 4 to 5; head 6 to 8½; eye small, 6 to 7 in head. D. 30, its longest ray a little longer than head; A. 7 or 8; scales 9–56–7. Color very dark, males in spring almost black. Length 2½ feet.

Apparently confined in this state to the Ohio river. "As far as Pittsburg," Rafinesque. Recorded for the Ohio by Kirtland and by Jordan, and Henshall in 1888 mentions it as "not uncommon in the Ohio river.

Genus: CATOSTOMUS.

Key to Species.

A. Head transversely convex above, the orbital rim not elevated, scales in lateral line 60 or more.
  B. Scales in lateral line about 100.— *catostomus.*
  BB. Scales in lateral line 64 to 70.— *commersonii.*
AA. Head broad, depressed, and transversely convex between the orbits; scales in lateral line, 48 to 55. *nigricans.*

Catostomus catostomus (Forster). NORTHERN SUCKER.

This species can at once be distinguished from the others of the genus occurring in Ohio, by the great number of scales in the lateral line, 95 to 114. About 29 cross rows between dorsal and ventrals. Head broad above, pointed in front; snout a little longer than remainder of head and much overhanging the mouth. Body rather slender and somewhat terete. D. 10; A. 7. Color, above, smoky gray; below, white. Length 2½ feet.

This species is one of northern distribution, probably not occuring in the tributaries of the Ohio. "Quite abundant in Lake Erie," Jordan (Ohio Rept.), 1878; Lake Erie, Henshall, 1889.

Catostomus commersonii (Lacepede). COMMON SUCKER; FINE-SCALED SUCKER.

Head rather conical, 4¼ in length of body, flattish above, but not concave between the eyes. Body moderately stout, terete or sub-terete, becoming heavier at the shoulders with age, depth 4 to 5 in length. D. 11 or 12; scales small, 10-64 to 70-9. Color olivaceous, tending toward blackish on back and lateral line. Length 18 inches.

One of the commonest species in the state, found in abundance in nearly every stream. Recorded for the state by Kirtland for the Big Miami, and small brooks of northern Ohio; "Swarming in every pond and stream in Ohio," Jordan (Ohio Rept.); Hamilton County, "Everywhere abundant," Henshall, 1888; Lorain County, "Very common in all our waters," McCormick, 1892; recorded by Kirsch for nearly every locality seined in the Maumee River System, 1893; taken by Mr. Williamson and myself in every stream in Franklin County, 1897; in every stream of the Big Jelloway Creek System in Knox County, Parker, Williamson and Osburn, 1898; taken by myself in 1899, at the following places: Ohio river and Ice creek at

Ironton, John's creek at Waterloo, Huron river at Milan, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, and North Fork of Licking river at Newark; and in 1900 in the Cuyahoga river at Hawkins, Breakneck creek near Kent, Chippewa lake, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon's Run at Bellaire, and Licking reservoir.

Catostomus nigricans Le Sueur. HOG SUCKER; STONE ROLLER.

Head large, concave between the eyes, 4¼ in length. Body nearly terete, depth 4½ to 5. D. 10 or 11; scales 48 to 55 in lateral line. Color, olive, becoming brownish on the back, which is crossed by several dark, irregular blotches; belly white. Length 2 feet.

This Sucker is very widely distributed over the state, being found in all suitable localities. Its especial haunts are clear, stony ripples and rock-bottomed pools. Not taken in lakes. Kirtland records it as two species, *Hypentelium macropterum* and *Catostomus nigrans;* "extremely abundant in every running stream in Ohio," Jordan (Ohio Rept.); Hamilton County, "everywhere abundant," Henshall, 1888; Lorain County, McCormick, 1892; Kirsch, 1893, records it for the streams at nearly all points investigated in the Maumee River System, "none taken in the lakes"; Franklin County, Scioto river, Olentangy river, Scioto Big Run, Grant's Run, Big Walnut creek, Rocky Fork, Black Lick, Alum creek, Big and Little Darby creeks and Hell Branch, Williamson and Osburn, 1897; every stream in the Big Jelloway Creek System, Parker, Williamson and Osburn, 1898; Ohio river and Ice creek at Ironton, John's creek at Waterloo, Huron river at Milan, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks near Dayton and North Fork of Licking river at Newark, R. C. Osburn, 1899; Cuyahoga river at Hawkins, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon's creek at Bellaire, and the outlet of Licking reservoir into Licking river, R. C. Osburn, 1900.

Genus: ERIMYZON.

Erimyzon sucetta oblongus (Mitchell). SWEET SUCKER; CHUB SUCKER.

Head 4 to 4¼ in length; snout not projecting; eye 4¼ to 4¾ in head. Body stout, compressed; depth in adults about 3, but younger specimens much more slender; back arched, old specimens becoming quite gibbous at the nape. Lateral line entirely wanting. Scales about 40, closely imbricated and somewhat crowded anteriorly, sometimes showing irregularities of arrangement. Length 10 inches. Color varying with age, in adults brown or brownish olive above, with a tendency to brassy on sides and belly; younger specimens are plain olivaceous, occasionally bright, "gold-fish yellow"; very young with a distinct, black lateral band, which breaks up into blotches a little later. Ohio specimens show some variations between the typical *E. sucetta* and the variety *oblongus*, but seem to agree more closely with the variety than with the typical form.

The Chub Sucker, or Sweet Sucker, is widely distributed over the state, but its occurrence is irregular. At some points it is an abundant species, at others rare. "Common in Little Miami and Ohio rivers," Henshall, 1888; "not common, I have taken a few in the lower part of Beaver creek," McCormick, 1892; Maumee river at Toledo, St. Joseph river at Edgerton, St. Mary's river at St. Mary's, Tiffin river at West Unity, Lost and Gordon creeks near Cecil, Kirsch, 1893; Franklin County, Scioto river, Scioto Big Run, Grant's Run, Big Darby, Little Darby and Hell Branch, Osburn and Williamson, 1897; Ohio river at Ironton, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, R. C. Osburn, 1899; Licking reservoir, E. B. Williamson; Sandusky Bay, very common in Black Channel, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, and Ohio river and McMahon creek at Bellaire, R. C. Osburn, 1900.

Genus: MINYTREMA.

Minytrema melanops (Rafinesque). WINTER SUCKER; SPOTTED SUCKER; STRIPED SUCKER.

Head 4¼; snout round, a trifle projecting. Body elongate, somewhat terete, back somewhat arched in front of dorsal fin; depth about 4. D. 12; A. 7. Scales about 46. Lateral line wanting in young, present but more or less interrupted in adults. Coloration dusky olive above, each scale with a more or less distinct black spot at its base, these forming rows along the rows of scales. Length about 18 inches.

Not usually a common species, though widely distributed. Recorded by Kirtland, 1838; Hamilton County, Little Miami and tributaries, Henshall, 1888; Lorain County, "Rare, Vermillion river and Beaver creek," McCormick, 1892; Maumee river at Grand Rapids, St. Joseph river at Edgerton, Fish creek at Edgerton, St. Mary's river at St. Mary's and Rockford, Auglaize river at Wapakoneta and Cloverdale, Blanchard river at Findlay, Kirsch, 1893; Franklin County, Scioto river, Olentangy river, Black Lick, Little Walnut and Big Darby, Williamson and Osburn, 1897; Stillwater creek near Dayton, and Wabash river near Celina, R. C. Osburn, 1899. At the latter place, in a series of pools formed by the outlet of St. Mary's reservoir, the species was taken in abundance, the only time I have ever taken more than a few individuals in one locality.

Genus: MOXOSTOMA.

Key to Species.

A. Dorsal fin of 15 to 18 rays; lower lip V-shaped.— *anisurum.*
AA. Dorsal fin of less than 15 rays; lower lip truncate behind, not evidently V-shaped.
B. Head rather large, 4 to nearly 5 in length, snout little projecting.—*aureolum.*
BB. Head small and conic, about 5¼ in length, the snout much projecting beyond the small mouth.— *breviceps.*

Moxostoma anisurum (Rafinesque). WHITE-NOSED SUCKER.

Head short and broad, flattened above, 3⅔ to 4¼ in length, eye midway in head, 4 to 5 in its length. Body compressed; back high, considerably more arched than in *M. aureolum;* depth 3½ in length. Fins all large. Color bright olivaceous to smoky above, white or silvery on sides and belly. Most easily distinguished from other species of the genus occurring in Ohio, by the long dorsal fin, containing from 15 to 18 rays.

This species is found in both the Lake and Ohio river drainage, but is not usually very common, and is confined to the larger streams. Ohio river, "as far as Pittsburg," Rafinesque. Given by Jordan (Ohio Rept.) as three species—*M. anisurum*, of which he says, "I have seen a few specimens, obtained in the Cincinnati market"; *M. velatum*, "frequently taken in the Ohio river and its tributaries," and *M. carpio*, from Lake Erie and the Ohio at Cincinnati and Marietta. These three are now regarded as synonymous (See Bull. 47, U. S. Natl. Mus.). Hamilton County,

not uncommon in Ohio river, Henshall, 1888; Lorain County, McCormick, 1892; Maumee river at Antwerp, Defiance and Toledo; Tiffin river at West Unity and Brunersburg, Auglaize river at Cloverdale, Oakwood and Defiance; Blanchard river at Ottawa, Hoaglin creek near Oakwood, Beaver creek at Grand Rapids, Kirsch, 1893; Franklin County, Scioto river, Olentangy river and Alum creek, Williamson and Osburn, 1897; Ohio river at Ironton, Huron river at Milan, R. C. Osburn, 1899; Ohio river at Bellaire, Licking reservoir, R. C. Osburn; 1900.

Moxostoma aureolum (Le Sueur). RED-HORSE; MULLET; WHITE SUCKER.

Head 4 to 5, flattened above; snout slightly projecting; eye 4¾ in head. Body rather stout, somewhat compressed; back, little elevated; depth 4 in length. D. 13. or more rarely 12 or 14; A. 7; scales about 45. Color olivaceous above, sides silvery; lower fins reddish, especially during the breeding season.

Until very recent years this has been recorded as two species, the short-headed, small-mouthed form as *M. aureolum*, and the more ordinary form as *M. macrolepidotum duquesnii* (Le Sueur). This matter is cleared up by Jordan and Evermann (Bull. 47, U. S. Natl. Mus.). It is very probable that some collectors have confused the short-headed form with *M. breviceps* (Cope), as I can find no record of *M. breviceps* for Ohio in any paper preceding Bull. 47, U. S. Natl. Mus., in which it is recorded as abundant in some portions of the state. However, as I have no direct evidence of any such error, I include all records for *M. aureolum* and *M. macrolepidotum duquesnii* under *M. aureolum*. Ohio river, "as far as Pittsburg," Rafinesque; recorded for the state by Kirtland as *Catostomus aureolus*, *C. Duquesnii* and *C. erythurus*; Hamilton County, "abundant in all streams explored," Lake Erie, Henshall, 1888–89; Lorain County, McCormick, 1892; Maumee river at Defiance, Grand Rapids and Waterville, St. Mary's river at Rockford, Auglaize river at Oakwood, Sugar creek at Lima, St. Joseph river at Edgerton, west end of Lake Erie, Kirsch, 1893; Franklin County, "abundant, taken in all but the smallest streams," Williamson and Osburn, 1897; Knox County, Big Jelloway creek system, "abundant, the young fry

ascending even the smallest brooks,'' May 26 given as a breeding date, Parker, Williamson and Osburn, 1898; Ohio river and Ice creek at Ironton, John's creek at Waterloo, Huron river at Milan, Sandusky Bay, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Niggermill Run at Salem, E. B. Williamson, 1900; Cuyahoga river at Hawkins, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon creek at Wheeling, Licking reservoir, R. C. Osburn, 1900.

Moxostoma breviceps (Cope).

Form of a *Coregonus*, with deep, compressed body, small head, and a conic snout, which overhangs the very small mouth. Caudal fin, with the upper lobe falcate, much longer than the lower. Dorsal fin short, high, falcate, the anterior rays 1⅓ to 1½ times base of fin, the free border much concave. Depth 3½ in length. Head 5 to 5¼. D. 12 or 13. Scales 6–45–5. Lower fins bright red.

''Abundant in Lake Erie; our specimens from Sandusky, Toledo and Cincinnati,'' Jordan and Evermann (Bull. 47, U. S. Natl. Mus.).

Genus: PLACOPHARYNX.

Placopharynx duquesnii (Le Sueur).

Head 4; snout rounded, projecting; lower jaw somewhat oblique when closed; eye 4½ in head. Body rather stout, somewhat compressed, in form like that of *M. aureolum;* D. 13; A. 7 (not 9, as is usually given, in any Ohio specimens I have seen); scales 6-45-6. Lower pharyngeal bones very strong, the lower teeth on these bones very strong and molar-like, little compressed, and having broad grinding surfaces.

This species so closely resembles *M. aureolum* that it can be positively distinguished only by the appearance of the lower pharyngeal teeth, and it has no doubt been much overlooked. Recorded by Jordan (Ohio Rept.) on the strength of a skeleton found by Dr. J. M. Wheaton in the Scioto river at Columbus, one of the very few specimens known at that time. The species has since proved to be well distributed over the state, though not usually abundant. Hamilton County, not rare in the Ohio, Henshall, 1888; Lorain County, Lake Erie, common with other

mullets, McCormick, 1892 ; Franklin County, Scioto river, Olentangy river and Big Darby creek, Williamson and Osburn, 1897 ; Ohio river at Ironton, Wabash river at Celina, R. C. Osburn, 1899 ; Ohio river at Bellaire, R. C. Osburn, 1900.

Genus: LAGOCHILA.

Lagochila lacera Jordan and Brayton. HARE-LIP SUCKER ; CUT-LIPS.

Head short, conical, with lengthened snout, the region between the eyes flattened and with prominent mucous ridges. Cheeks and lower part of head rather swollen. Opercle much reduced, its greatest length scarcely greater than diameter of eye. Head 4⅔ in length. Eye 4½ in head, 2 in length of snout. Body rather slender, depth 4⅔. Dorsal fin rather low, its rays 12 ; A. 7 ; V. 9 ; scales 5–45–5. Mouth very singular ; the upper lip is broad and fleshy, not separated from the skin of the forehead by a crease ; at each side of the mouth a sharp fold of skin is formed, which descends to the mid line below, passing under the lower jaw, but is separated from that of the opposite side by a longitudinal crease ; in front of these the fleshy lower lip is split into two large depending lobes.

This species has been recorded for but three localities in the state. Its rare occurrence in the state was first noted by Dr. Jordan in Klippart's "Second Annual Report of the Ohio State Fish Commission for 1877," where he says : "Mr. Klippart finds it very abundant in the Scioto, where it has been overlooked by all the collectors from Rafinesque and Kirtland down," and Mr. Klippart further comments : "The fisherman assured me that he had taken them several years in succession." Twenty years later, the investigations on the fishes of Franklin County, carried on by Mr. Williamson and the writer, and extending over a period of several years, failed to bring to light a single specimen of this species, though the Scioto river was hauled in many places. The species has been taken in the state by Kirsch, in 1893, in the Auglaize river at Cloverdale, and in the Blanchard river at Ottawa.

Family: CYPRINIDÆ (The Minnows).

Key to Genera.

I. (Dorsal fin long, with 2 or 3 spines, and 18 or 20 rays ; introduced species.

A. Teeth in 3 rows, 1, 1, 3–3. 1, 1, all molar ; 4 barbels.— CYPRINUS.
AA. Teeth in 1 row, 4–4, molar, but compressed ; barbels wanting.— CARASSIUS.)

II. Dorsal fin short, without developed spine.

A. Air bladder surrounded by many convolutions of the very long alimentary canal.— CAMPOSTOMA.
AA. Air bladder above the alimentary canal, not surrounded by convolutions of the intestine.
B. Alimentary canal more than twice the length of body ; teeth in 1 row ; peritoneum usually black.
C. Teeth 5–5 or 4–5 ; scales minute.— CHROSOMUS.
CC. Teeth 4–4 ; scales larger.
D. A small barbel present at base of maxillary ; color silvery.— HYBOGNATHUS.
DD. Barbel wanting; color olivaceous, little silvery.—PIMEPHALES.
BB. Alimentary canal less than twice the length of body; peritoneum usually silvery.
E. Lower jaw normally formed, dentary bones free from each other except at the symphysis.
F. Teeth in main row 5–5 or 4–5.
G. Abdomen rounded behind ventral fins, not compressed into a scaleless ridge; anal basis short.
H. A minute barbel present on maxillary at a little distance above its base.— SEMOTILUS.
HH. Maxillary without barbel.
I. Teeth in 2 rows, 2, 4–5, 2.— LEUCISCUS.
II. Teeth in 1 row, 5–5. Mouth extremely small.— OPSOPŒODUS.
GG. Abdomen compressed behind ventral fins into a sharp, scaleless ridge; anal basis longer.— ABRAMIS.
FF. Teeth in main row 4–4.
J. Maxillary without barbel.
K. No cavernous lymph spaces visible in mandible, sub-opercle and inter-opercle.
L. First (rudimentary) ray of dorsal detached from the first developed ray and connected to it by a membrane; a conspicuous black spot at base of caudal and dorsal.—CLIOLA.
LL. First (rudimentary) ray closely attached to first developed ray.— NOTROPIS.
KK. Mandible, sub-opercle and inter-opercle, with conspicuous, externally visible, cavernous lymph chambers.— ERICYMBA.
JJ. Maxillary barbel present.
M. Premaxillaries not protractile, connected to skin of forehead in the median line without a cross groove; teeth 2, 4–4, 2. RHINICHTHYS.
MM. Premaxillaries protractile, a cross groove separating them from the skin of forehead in front; only 1 tooth in lesser row.— HYBOPSIS.
EE. Lower jaw singularly formed, the dentary bones parallel and united for their entire length ; a conspicuous, fleshy lobe on each side at base.— EXOGLOSSUM.

Genus: CYPRINUS.

Cyprinus carpio Linnaeus. THE CARP.

The Carp may be readily distinguished from any of our native *Cyprinidæ* by the presence of four long barbels, and by the very long dorsal fin—about 20 rays—preceded by a stout spine, which is serrated behind. Anal fin short, of about 5 rays, also preceded by a spine. The lower pharyngeal teeth, unlike those of any native American Minnow, are in 3 rows, 1, 1, 3–3, 1, 1. The lateral line is complete. Many varieties have resulted from cultivation. Chief among these are the "Full-scale," in which the body is covered with strong scales, after the formula, 6–40–5; the "Half-scale" or "Mirror," characterized by a few rows of very large scales; and the "Leather Carp," in which the scales are entirely absent.

The Carp was first introduced into the state to stock ponds and lakes, but, escaping from cultivation, has become generally distributed over the state and occurs in streams as well as ponds and lakes. Recorded for the state by Henshall, 1889, in Ross lake and Little Miami river; Lorain County, occasionally taken in the rivers, McCormick, 1892; Maumee river at Toledo (abundant), St. Marys river at Rockford, Tiffin river at West Unity, and west end of Lake Erie (abundant), Kirsch, 1893; Franklin County, "of general distribution throughout the county," Williamson and Osburn, 1897; Knox County, Big Jelloway creek, "very common," Parker, Williamson and Osburn, 1898; very common in Sandusky Bay, R. C. Osburn, 1899; Wheeling creek at Bridgeport, Ohio river at Bellaire, and Licking reservoir, R. C. Osburn, 1900.

Genus: CARASSIUS.

Carassius auratus (Linnaeus). GOLDFISH.

The Goldfish may be distinguished from our native Minnows by the very long dorsal fin, preceded by a stout, serrated spine; the anal of 7 rays, with a similar spine. From the Carp it is distinguished by the absence of the barbels about the mouth, and by the teeth, which are 4–4. As in the Carp, cultivation has produced many varieties.

It has escaped from cultivation in some parts of Ohio, and has been reported by Henshall, 1888, as "not rare in the canal basin near Elmwood, Hamilton County.

Genus: TINCA.

Tinca tinca (Linnaeus). TENCH.

In the spring of 1898 a freshet carried away the banks of an artificial lake on the grounds of the Ohio State University, at Columbus, and many of the Tench, with which the lake was stocked, escaped into the Olentangy river. In September of the same year specimens were taken at the mouth of the small stream flowing from the lake to the river. Whether the Tench will hold its own in the streams of Ohio yet remains to be seen.

Genus: CAMPOSTOMA.

Campostoma anomalum (Rafinesque). STONE-ROLLER; STEEL-BACKED CHUB; MAMMY; DOUGH-BELLY.

This species is most easily distinguished by an examination of the intestine, which is very long and is wound in many convolutions about the air-bladder. This arrangement is peculiar to this genus among all known fishes. Head 4; depth $4\frac{2}{5}$; eye 5 to $5\frac{1}{2}$ in head; D. 8; A. 7; scales 7–48–6; teeth 4–4. Body stoutish. Snout somewhat decurved, mouth inferior. Color brownish, almost black in adult breeding males; sides brassy, irregularly mottled with dark olivaceous or brown; fins usually plain, in breeding males the dorsal is tinged with orange, a black bar through its middle, other fins more or less tinged with orange. Entire dorsum of breeding males covered with tubercles. Young with a dark lateral band extending onto gill covers and between eye and tip of snout. Length 6 to 8 inches.

A very abundant and widely distributed species, generally most abundant in small streams and on ripples of larger ones. First recorded for the state by Kirtland under the name *Exoglossum lesueurianum;* given by Jordan as "extremely abundant in every stream in the state"; Hamilton County, "abundant in every stream explored," Henshall, 1888; Lorain County, "common in most of our streams," McCormick, 1892; Franklin County, "very abundant everywhere," Williamson and Osburn, 1897; Big Jelloway creek system, "apparently the most abundant species," Parker, Williamson and Osburn, 1898; recorded for many places in the Maumee river system (not taken in St. Mary's river) by Kirsch, 1893; Ohio river and Ice creek at Ironton, Huron river at Milan, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, north fork of Licking river at Newark, R. C. Osburn, 1899; Niggermill Run at Salem, E. B. Williamson, 1900; Cuyahoga river at Kent and Hawkins, Breakneck creek at Kent, Chippewa lake, Summit lake, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon creek at Bellaire, Licking reservoir, R. C. Osburn, 1900.

Genus: CHROSOMUS.

Chrosomus erythrogaster Rafinesque. RED-BELLIED DACE.

Head 4; depth 4; eye 3½. D. 8; A. 8; teeth 5–5; scales 16–85–10. Body rather elongate, the head pointed; mouth small, terminal, somewhat oblique. Lateral line developed backward about as far as the dorsal fin. Color above, brownish; a black vertebral line, bordered on either side by a row of black dots; sides creamy white, bordered above and below with a black band, the lower the wider and extending forward through eye; under parts white, in breeding males entirely suffused with vermillion; fins all bright sulphur yellow, the dorsal with a bright red spot at its base, anteriorly; females and young less brilliantly colored. Length 2 to 3 inches.

The Red-bellied Dace is widely distributed and is generally abundant where found, but it is strictly a "brook species," being confined to small clear streams and spring runs. Recorded for the state by Dr. Kirtland; Lorain County, "I have found them in but one stream, Spring brook," McCormick, 1892; "collected by Prof. Meek in Lost creek, near Defiance," Kirsch, 1893; Franklin County, Grant's Run and Plum Run, tributaries of the Scioto river, in abundance, Williamson and Osburn, 1897; Knox County, Parker's Run, a tributary of Big Jelloway creek, "in considerable numbers," Parker, Williamson and Osburn, 1898; Licking County, occurring in abundance in spring runs tributary to North Fork of Licking river near Newark, R. C. Osburn, 1899; Niggermill Run at Salem, E. B. Williamson, 1900.

Genus: HYBOGNATHUS.

Hybognathus nuchalis Agassiz. SILVERY MINNOW.

Head 4½ to 5; depth 4⅛; eye 4; D. 8; A. 7; teeth 4–4; scales 5–38–4. Body elongate, comparatively slender. Head moderate, the profile evenly curved; upper jaw heavy, lower thin. Scales large and silvery, 12 to 14 in front of dorsal. Lateral line decurved. Intestines very long, 7 to 10 times the length of body. Color olivaceous green above, translucent in life; sides clear silvery; fins plain. Length 4 to 7 inches.

This species seems to be confined to the southwestern part of the state. Jordan, in his Ohio Report, gives it as abundant in small streams flowing into the Ohio river, but Dr. Henshall records it for only White Oak creek and the Ohio river, and in my work at Ironton and Bellaire I failed to find it. This species is not mentioned by any other collector.

Genus: PIMEPHALES.

Key to Species.

A. Lateral line more or less incomplete; body very short and stout.— *promelas.*
AA. Lateral line complete; body moderately elongate.— *notatus.*

Pimephales promelas Rafinesque. FAT-HEAD.

Head 4; depth 3¾ to 4; eye 4. D. I, 7; A. 7; scales 7 or 8–43 to 47–5 or 6. Body very short and deep. Head short, everywhere convex, almost globular in adult males. Scales deep, closely imbricated; lateral line incomplete. Color dark olivaceous above, paler below; a dark lateral band and caudal spot; dorsal fin with a dusky shade through it at the middle, Breeding males with the head nearly black, with tubercles on snout and lower jaw. Length 2½ inches.

Recorded by Kirtland. Given by Jordan as most abundant in small streams flowing into the Ohio; Hamilton County, "very abundant everywhere," Henshall, 1888; Lorain County, "not common, but found in most of the streams," McCormick, 1892; Maumee river at Cecil, Lost and Gordon creeks near Cecil, Sugar creek at Lima, Kirsch, 1893; Knox County, Big Jelloway creek, rare, Parker, Williamson and Osburn, 1898; Ohio river at Ironton, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, R. C. Osburn, 1899; Niggermill Run at Salem, E. B. Williamson, 1900; Pippin lake, Cuyahoga river at Hawkins, Ohio river at Bellaire, R. C. Osburn, 1900.

Pimephales notatus (Rafinesque). BLUNT-NOSED MINNOW.

Head 4½; depth 4½ to 5; eye 4. D. I, 7 or 8; A. 7; scales 6–45–4, 22 in front of dorsal, much crowded and irregularly arranged anteriorly. Body rather elongate. Head moderate, the snout very blunt and convex; top of head depressed; mouth small, inferior, horizontal. Color olivaceous, sometimes very dark; a black spot at base of dorsal fin in front. Males in breeding season with the head black or nearly so, and with about 16 large tubercles on the snout. Length 4 inches.

This species is much more abundant than the preceding. "Swarms in all the streams of the state," Jordan; Hamilton County, "the most abundant minnow," Henshall. 1888; Lorain County, "very abundant in small streams," McCormick, 1892; Kirsch records it for every stream of the Maumee river system explored in Ohio; Franklin County, "our most abundant minnow,

in great numbers in every stream," Williamson and Osburn, 1897 ; Knox County, abundant in every stream of the Big Jelloway creek system, Parker, Williamson and Osburn, 1898 ; Ohio river and Ice creek at Ironton, Huron river at Milan, Sandusky Bay, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, North Fork of Licking river near Newark, R. C. Osburn, 1899 ; Niggermill Run at Salem, Mahoning river, E. B. Williamson, 1900 ; Pippin lake, Chippewa lake, Summit lake, Cuyahoga river at Kent and Hawkins, Breakneck creek at Kent, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon's creek at Bellaire, Licking reservoir, R. C. Osburn, 1900.

Genus: Semotilus.

Semotilus atromaculatus (Mitchill). Horned Dace ; Chub.

Head 3¾ ; depth 4; eye 5 to 5½. D. 7; A. 8; scales 9–55 to 60–6, about 30 in front of dorsal; teeth 2, 5–4, 2. Head large and heavy, broad and rounded above; snout broad; mouth broad, oblique; a small barbel on the maxillary some distance above its posterior end, not evident in young specimens. Body stout, arched in front of dorsal. Dorsal inserted behind ventrals. Color dusky olivaceous or bluish above, paler below; sides with a brassy luster; an indistinct lateral band and caudal spot (these markings distinct in young). Dorsal with a black spot at its base anteriorly. Sides of head and lower fins rosy in breeding males. These have also the snout covered with tubercles. Length 10 inches.

A widely distributed species, occurring abundantly in brooks throughout the state, less commonly in the larger streams, and rarely in lakes. In seining up stream the increase in number of individuals of this species as the headwaters are approached is very noticeable. Kirtland, following Rafinesque, recorded it for the state as two species, *S. dorsalis* and *S. cephalus*. Both are synonyms of *S. atromaculatus*. Hamilton County, "abundant in all streams," Henshall, 1888 ; Lorain County, "abundant in most of the streams," McCormick, 1892 ; "generally distributed throughout the Maumee river basin," Kirsch, 1893 ; Franklin County, abundant in all streams, Williamson and Osburn, 1897 ; Knox County, Big Jelloway creek system, Parker, Williamson

and Osburn, 1898; Ice creek at Ironton, John's creek at Waterloo, Huron river at Milan, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Niggermill Run at Salem, Mahoning river, E. B. Williamson, 1900; Sandusky Bay, Cuyahoga river at Kent and Hawkins, Breakneck creek at Kent, Chippewa lake, Grand river at Painesville, Chagrin river at Willoughby, R. C. Osburn, 1900.

Genus: LEUCISCUS.

Leuciscus elongatus (Kirtland). RED-SIDED DACE.

Head 4; depth 5; eye 4 to 4⅓. D. 8; A. 9; scales 10-70-5; teeth 2, 5-4, 2. Body elongate, compressed; head long, pointed; mouth very large, oblique, the maxillary extending to middle of orbit; lower jaw projecting, with a small knob at its symphysis. Color above varying from a dark bluish to greenish, sides somewhat paler and mottled; a dark vertebral line; along the side is a broad band, bright blood red anteriorly, black posteriorly, the two colors shading into each other imperceptibly at about middle of body; above this band is a narrow brassy band; belly silvery white. In breeding males the belly and lower fins are tinged with rosy; in females and young the bright colors are subdued or wanting. Length 5 inches.

The Red-sided Shiner is certainly one of the most elegant of fishes. It is, generally speaking, a brook species, inhabiting clear deep pools of brooks and spring runs, though Dr. Kirtland, who described the species, records it for Lake Erie. It is found in the tributaries of the Ohio and of the Lake, but has not been noticed in the western part of the state. Mahoning river in Trumbull County, and Lake Erie near Cleveland, Kirtland; Lorain County, "common in Spring brook, but not found elsewhere," McCormick, 1892; Knox County, Little Jelloway creek, Black Run, Parker's Run, Joe Sapp Run, Shadly Run and Doudy creek, tributaries of Big Jelloway creek, common, Parker, Williamson and Osburn, 1898; Wilson's Run, a small tributary of the North Fork of Licking river near Newark, R. C. Osburn, 1899; Niggermill Run at Salem, E. B. Williamson, 1900; a small tributary of the Grand river at Painesville, R. C. Osburn, 1900.

Genus: Opsopœodus.

Key to Species.

A. Lateral line complete or very nearly so; dorsal fin with black blotch on anterior rays, usually none on the posterior.— *emiliæ.*

AA. Lateral line always incomplete; dorsal usually with a conspicuous black spot on posterior rays.— *megalops.*

Opsopœodus emiliæ Hay.

Head about 4½; depth 4⅘; eye 3. D. 9; A. 8; scales 5–40–3; teeth 5–5, very slender, strongly hooked, and deeply serrate. Body rather elongate, moderately compressed, not elevated. Head short and slender. Muzzle blunt and rounded. Mouth very small and very oblique, smaller than in any other of our *Cyprinidæ*, with scarcely any lateral cleft. Caudal peduncle long and slender, caudal deeply forked, Breast naked; 16 scales before dorsal. Lateral line complete or very nearly so. Yellowish; sides silvery; scales above dark edged; usually a dark lateral band from snout to caudal, above and below which are series of black dots; anterior rays of dorsal dark, no black spot on the posterior rays.

Given by Jordan and Evermann (Bull. 47) for Lake Erie; "two small specimens from the St. Mary's river at St. Mary's," Kirsch, 1893.

Opsopœodus megalops (Forbes).

Head 4¾; depth 4 to 5; eye 2¾. D. 7 or 8; A. 7 or 8; scales 5–39–4, 15 before dorsal. Teeth 5–5, hooked and crenate. Lateral line always incomplete, sometimes on 4 or 5 scales only; sometimes extending with interruptions to middle of caudal peduncle. Body slender, fusiform; mouth small, terminal, oblique, so much so in old specimens as to appear almost vertical, the chin projecting beyond mouth, in younger specimens the mouth is less oblique. Top of head covered with prickles in old males. Fins large, caudal deeply forked. Breast partly naked. Yellowish brown, sides silvery; scales above dark-edged. Dorsal fin with a black blotch on 4 anterior rays; a second black blotch usually present on 3 posterior rays. Length 2⅓ inches.

I have given above the separation of *O. emiliæ* and *O. megalops* as given by Jordan and Evermann (Bull. 47, U. S. Natl. Mus.) They suggest in regard to *O. megalops* that it is "perhaps not a distinct species." A comparative study of these forms confirms this belief. A dozen specimens taken by the writer in the headwaters of the Wabash river at Celina, August, 1899, and two from Summit lake at Akron, July 30, 1900, are referable to *O. megalops* as given above, but so many variations between

O. emiliæ and *megalops* exist among these specimens that it is possible to establish a graduated series between the two species, and none of the characters given in the above separation are found to be constant. The lateral line in some cases ceases in front of the dorsal fin, and in others is continuous to within two or three scales of the caudal. The second dorsal spot is also subject to great variation, for, while in old males it is distinct, in some cases it is very indistinct or wanting altogether. The fin formulæ and squamation of the breast also vary. Recently, through the kindness of Dr. S. E. Meek, I have been permitted to examine specimens of *O. emiliæ* from Indian Territory, Arkansas and Illinois, in the Field Columbian Museum at Chicago. These specimens show much the same variation as that given for *O. megalops*. As I have had no opportunity to compare with the type specimens, I hesitate to reduce *O. megalops* to synonymy, although the two species, as determined by Dr. Meek and myself, undoubtedly intergrade.

Genus: Abramis.

Abramis crysoleucas (Mitchill). Golden Shiner; Golden Bream; Roach.

Head 4½; depth 3. D. 8; A. 13; scales 10–46 to 55–3; teeth 5–5. Body strongly compressed, the belly behind ventrals compressed into a sharp keel, over which the scales do not pass. Color, greenish above, the sides silvery, with bright golden reflections. Length about a foot.

The Golden Bream is an abundant resident of the state in suitable localities, being found chiefly in ponds, quiet pools and weedy bayous, apparently more common in the northern part of the state. Given by Rafinesque under the name *Notemigonus auratus* for the Ohio and Miami rivers; recorded by Kirtland under the name *Rutulus crysoleucas;* given by Jordan as "extremely abundant in every pond, lake or bayou"; Hamilton County, "common in Bloody Run and Clear creek," Henshall, 1888; Lorain County, "very common in still waters," McCormick, 1892; Maumee river at Cecil, Grand Rapids, Waterville and Toledo, St. Mary's river at St. Mary's and Rockford, Tiffin river at West Unity, Auglaize river at Oakwood and Defiance, Sugar creek and Lost creek at Lima, Blanchard river at Findlay,

Kirsch, 1893; Franklin County, Scioto river, Scioto Big Run, Big Walnut creek, Mason's Run, Big Darby creek, Hell Branch, Williamson and Osburn, 1897; Knox County, Big Jelloway creek, Parker, Williamson and Osburn, 1898; Sandusky Bay, Ashtabula creek at Ashtabula, Wabash river at Celina, R. C. Osburn, 1899; Niggermill Run at Salem, E. B. Williamson, 1900; Chippewa lake, Licking reservoir, R. C. Osburn, 1900.

Genus: Cliola.

Cliola vigilax (Baird and Girard).

Head 4¼; depth 4½; eye 3½. D. 8; A. 7; scales 8–42–6, about 28 before dorsal; teeth 4–4, with grinding surface and slight hook. Superficially, much resembling *Pimephales notatus*, but the form is more stout, the mouth more terminal, and the alimentary canal less than twice the length of the body. Caudal peduncle quite deep. Color, greenish, sides pale, darker above, the scales above dark-edged; a dark lateral band ending in a distinct caudal spot; a well defined black spot on anterior rays of dorsal. Length 3 inches.

This minnow has, to the best of my knowledge, been recorded from but two localities in the state. It has been taken by Henshall in Hamilton County, "common in O'Bannon creek," and a single specimen was taken in Big Walnut creek, Franklin County, by Mr. E. B. Williamson and the writer in 1897. It is probably common nowhere in the state except in the southwestern part, as its range is for the most part farther south and west.

Genus: NOTROPIS.

Key to Species.

A. Teeth 4-4, 1, 4-4, 0, or 1, 4-4, 1 (sometimes 2 teeth in one or both inner rows in *N. hudsonius* and *N. heterodon*).
  B. Scales not very closely imbricated, not notably deeper than long; dorsal inserted nearly over the ventrals; no black spot on dorsal fin.
    C. Teeth one-rowed, 4-4 (sometimes 2, 4-4, 2 in *N. heterodon*).
      D. Lateral line usually more or less incomplete; small species, usually with a dusky lateral band.
        E. Mouth very small, chin pale.— *cayuga.*
        EE. Mouth moderate; chin black.— *heterodon.*
      DD. Lateral line always complete; small, weak species.
        F. Fins all small and low, pectorals not reaching ventrals.— *blennius.*
        FF. Fins high, pectorals reaching ventrals.— *volucellus.*
    CC. Teeth two-rowed, 1, 4-4, 0; 1, 4-4, 1; or 1, 4-4, 2, the grinding surface more or less developed.
      G. No distinct dark spot at base of caudal.— *shumardi.*
      GG. A distinct dark spot present at base of caudal fin.— *hudsonius.*
  BB. Scales deeper than long, closely imbricated along side of body. Usually a distinct black spot on last rays of dorsal.— *whipplii.*
AA. Teeth 2, 4-4, 2 (2, 4-4, 1 in *N. jejunus*).
  H. Anal fin short, of 7 to 9 developed rays.
    I. Teeth with the grinding surface developed.
      J. Scales closely imbricated along the sides, no dark spot at base of caudal.— *cornutus.*
      JJ. Scales not closely imbricated, a dark spot at base of caudal at least in young.
        K. 13 scales before dorsal fin.— *heterodon.*
        KK. 18 scales before dorsal.— *hudsonius.*
    II. Teeth without evident grinding surface, scales not closely imbricated.
      L. Eye very large, $2\frac{3}{5}$ in head; teeth 2, 4-4, 2.— *ariommus.*
      LL. Eye $3\frac{2}{3}$ in head. teeth 2, 4-4, 1.— *jejunus.*
  HH. Anal fin long, of 11 or 12 rays; dorsal inserted behind ventrals.
    M. Scales not closely imbricated on sides, not crowded anteriorly.
      N. Eye very large, $2\frac{3}{4}$ to 3.— *arge.*
      NN. Eye smaller, $3\frac{1}{4}$ to 4.
        O. Front of dorsal midway between snout and base of caudal fin; eye $3\frac{1}{4}$— *atherinoides.*
        OO. Front of dorsal nearer to base of caudal than to snout; eye 4.— *rubrifrons.*
    MM. Scales small and crowded anteriorly, closely imbricated; a black spot at base of caudal.— *umbratilis.*

Notropis cayuga Meek.

Head 4 or a little over; depth $4\frac{1}{2}$; eye $3\frac{1}{2}$. D. 8; A. 8; scales in lateral line about 36, 14 before dorsal; teeth 4-4. Close to *N. heterodon*, from which it can be distinguished most readily by the absence of any black on the chin. Lateral line wanting on some scales. Jaws nearly equal. A black band along lateral line, continued forward along sides of head and around snout on upper jaw. Length $2\frac{1}{2}$ inches.

First recorded for the state by Kirsch, 1893, "a few specimens from the Maumee river at Toledo"; Franklin County, "rare in Big Walnut and Little Darby creeks, common in Mason's Run," Williamson and Osburn, 1897; Sandusky Bay and Ashtabula creek at Ashtabula, common in both places, R. C. Osburn, 1899. This species seems to have been overlooked or confused with some other species by the earlier investigators, as its occurrence in both the Lake and Ohio river drainage at the points above noted would indicate a pretty general distribution over the state in suitable localities.

* **Notropis heterodon** (Cope).

Head 4; depth 4; eye 3, longer than snout. D. 8; A. 8; scales 5-36-3, 13 in front of dorsal. The lateral line incomplete, extending usually about to dorsal fin, but varying greatly; teeth 4–4 (sometimes 2, 4–4, 2). Body moderate; the back slightly elevated. dorsal inserted nearer the snout than base of caudal. Coloration olivaceous, darker on the back; a distinct lateral band, which passes forward through eye and on both jaws; chin distinctly black. Said to be an exceedingly variable species.

Taken by the writer in Sandusky Bay, July, 1899, and again in Sandusky Bay at Cedar Point and Black Channel, 1900.

Notropis blennius (Girard). STRAW-COLORED MINNOW.

D. 8; A. 8; scales 5–36–4, 14 in front of dorsal; teeth 4–4. Head 4; depth 4 to 5; eye large, 3 in head. Body moderately stout, but little compressed. Head rather broad; mouth small, inferior, horizontal. Lateral line complete. Dorsal fin low, its longest ray ¾ of head. Coloration, pale or yellowish olive; sometimes with a dark lateral band, and edges of mouth dark. Length 2½ inches. An exceedingly variable Minnow.

This insignificant looking species occurs widely and abundantly throughout the state and has been recorded by all the recent writers upon the fishes of the state, beginning with Jordan (Ohio Rept.), under various names—*N. blennius*, *N. deliciosus* and *N. stramineus*. Hamilton County, "abundant in Little Miami river and Clough creek," Henshall, 1888; Lorain County, given as two species, *N. deliciosus*, very abundant in all the streams, and *N. stramineus*, not common, McCormick, 1892; Maumee river at

* *Notropis anogenus* Forbes and *N. fretensis* (Cope); two small species closely resembling *N. heterodon* and *N. cayuga*, respectively, have been taken almost on our borders in streams flowing into the state. They may be looked for in north-western Ohio. *N. anogenus* may be known from *N. heterodon* by the usually complete lateral line and the included lower jaw. *N. fretensis* is separated from *N. cayuga* (with which it is perhaps identical), by the complete lateral line and the presence of 17 scales in front of the dorsal.

Antwerp, Cecil, Defiance and Waterville, Tiffin river at Brunersburg, Auglaize river at Cloverdale, Sugar creek at Lima, Blanchard river at Ottawa, Beaver creek at Grand Rapids, Kirsch, 1893; Franklin County, common in almost every stream, females with eggs, July 16, Williamson and Osburn, 1897; Knox County, Big Jelloway creek system, "abundant, females with ripe eggs on May 25," Parker, Williamson and Osburn, 1898; Ice creek at Ironton, John's creek at Waterloo, Huron river at Milan, Sandusky Bay, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, North Fork of Licking river at Newark, abundant in most places, R. C. Osburn, 1899; Pippin lake, Cuyahoga river at Hawkins, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon's Run at Bellaire, Licking reservoir, R. C. Osburn, 1900.

Notropis volucellus (Cope).

Head 3¾; depth 4; eye 3⅓. D. 8; A. 8; scales 4-34-3; teeth 4-4. Fins more elongate than in related species, the pectorals reaching ventrals. Very similar to *N. blennius*, but distinguished especially by the noticeably higher fins. Length 2½ inches.

The only record I am able to find of the occurrence of this species in Ohio is that given by Kirsch in his "Report upon Investigations in the Maumee River System," in which he mentions the fact that specimens from Gordon creek, taken by Prof. S. E. Meek, are given him as *Notropsis deliciosus* var. *volucella* Cope. Cope's *volucellus* is now regarded as a distinct species.

Notropis shumardi (Girard).

Head 3¾; depth 4⅓; eye very large, 2⅓ to 3 in head. D. 8; A. 7 or 8; scales 4 or 5–36–2 to 4, 13 in front of dorsal; teeth 1, 4–4, 1, with deep grinding surface, and the edge strongly crenate. Body compressed, the back elevated; tail slender. Head compressed, flattened above, below and on the sides; snout short, obtuse; mouth very oblique, terminal, lower jaw included. Fins large. Lateral line complete, decurved. Color, olivaceous above, pale below; a dark lateral band, and vertebral line; scales above dark-edged. Length 3 inches.

Recorded by Kirsch as *N. boops* Gilbert, "common in the Maumee river at Grand Rapids," and "five specimens from the

Blanchard river at Findlay," 1893. Rare in Big Walnut creek, Franklin County, Williamson and Osburn, 1897; a single specimen from Stillwater creek near Dayton, R. C. Osburn, 1899.

Notropis hudsonius (De Witt Clinton). SPOT-TAILED MINNOW; SHINER.

Head 4¾; depth 4; eye 3. D. 8; A. 8; scales 5-39-4, 18 before dorsal; teeth 1, 4-4, 0 or 1 or 2. Body elongate, considerably compressed in adult. Head short; muzzle blunt, decurved, shorter than the very large eye; mouth moderate, nearly horizontal, jaws sub-equal. Lateral line nearly straight, slightly decurved anteriorly. Coloration very pale, with a broad silvery band along side, this frequently underlaid with a dusky band. A dark spot at base of caudal, most distinct in young. Length 4 to 6 inches.

This species is apparently confined to the most northern portions of the state, in Lake Erie and its larger tributaries. Lorain County, "common in the lake and at the mouth of the rivers," McCormick, 1892; "very common in the Maumee river at Grand Rapids, a single specimen at Toledo," Kirsch, 1893; Lake Erie near Sandusky, abundant, R. C. Osburn, 1900; Sandusky Bay, Morse and Herbert T. Osborn, 1900.

Notropis whipplii (Girard). SILVER-FIN.

Head 4¼; depth 4 in adult males, females and young much slenderer; eye 4½. D. 8; A. 8 or 9; scales 5 or 6-38 to 40-3 or 4; teeth 1, 4-4, 1. Body moderately elongate, compressed, the back and belly about equally arched. Head rather short and deep. Scales closely imbricated (much higher than wide) and of a very regular pattern, about 18 in front of dorsal. Color leaden or steel-blue, the sides silvery; a dark vertebral line; a black spot covering the posterior 3 membranes of the dorsal fin, this sometimes very much reduced in young and females, but always present. Breeding males have the fins tipped with creamy white, and the top of head and dorsal region in front covered with small prickles. Length 4 inches.

This elegant little fish is widely distributed throughout the state, and is usually quite common in all suitable localities. Recorded by Kirtland under the name *Luxilus kentukiensis*. Given by Jordan in his Ohio Report under the name *Hudsonius analostanus*, which he here confuses with *N. whipplii*. *Notropis* (*Hudsonius*) *analostanus* is an eastern form, possibly not specifically distinct from *N. whipplii* (see Jordan and Evermann, Bull. 47, U. S. Natl. Mus.) Hamilton County, common in all streams explored, Henshall, 1888; Lorain County, all streams examined,

but not very common, McCormick, 1892 ; taken throughout the Maumee river basin in Ohio, except in Gordon creek and the west end of Lake Erie, Kirsch, 1893 ; Franklin County, occurs abundantly in all the larger streams, females with ripe eggs June 28, Williamson and Osburn, 1897 ; Knox County, Big Jelloway creek and tributaries, not rare, Parker, Williamson and Osburn, 1898 ; Ohio river at Ironton, Huron river at Milan, Sandusky Bay, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899 ; Mahoning river, E. B. Williamson, 1900 ; Cuyahoga river at Hawkins, Chippewa lake, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon's Run at Bellaire, Licking reservoir, R. C. Osburn, 1900.

Notropis cornutus (Mitchill). COMMON SHINER ; SILVERSIDES.

Head 3¼ to 4¼ ; depth about 3 (2¾ to 3½); eye 4–5¾. D. 8; A. 9; scales 6–41–3 or 4, closely imbricated, 18 or 20 before dorsal; teeth 2, 4–4, 2, with narrow grinding surface. Body varying much with age, in young slender, in adult short, deep and compressed. Lateral line decurved. Color above, dark olive green to steel-blue, sides silvery, with a brassy lateral band; a brassy vertebral line (this color showing only in fresh specimens, sometimes appearing as a dark line when out of water). Fins all plain, rosy tipped in breeding males. Females and young plainer. One of the most variable of our Minnows, varying with age, sex and season. Length about 10 inches.

One of the most abundant of fishes all over the state. Given by Kirtland as *Rutulus compressus* and *Luxulus chrysocephalus ;* by Jordan as *Luxulus cornutus.* Hamilton County, as *Notropis megalops*, "abundant everywhere," Henshall, 1888 ; Lorain County, "very common everywhere," McCormick, 1892 ; Maumee river system, "every stream," Kirsch, 1893 ; Franklin County, "taken in every stream, generally abundant, females with eggs on July 6," Williamson and Osburn, 1897 ; Knox County, taken in every stream of the Big Jelloway creek system, Parker, Williamson and Osburn, 1898 ; Ohio river and Ice creek at Ironton, John's creek at Waterloo, Huron river at Milan, Sandusky Bay, Ashtabula creek, Wabash river at Celina, Stillwater and Wolf creeks at Dayton, and North Fork of Licking river at

Newark, R. C. Osburn, 1899; Niggermill Run and Mahoning river, E. B. Williamson, 1900; Cuyahoga river at Kent and Hawkins, Breakneck creek at Kent, Summit lake, Chippewa lake, Licking reservoir, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon's creek at Bellaire, R. C. Osburn, 1900.

Notropis ariommus (Cope).

Head 3¾ to 4¼; depth 4¼ to 5. D. 8; A. 9; scales 6–39–2, large, 15 before dorsal; teeth 2, 4–4, 2. Body stout, moderately elevated, somewhat compressed. Head heavy, broad above; snout moderate, somewhat decurved; mouth moderate, oblique, jaws equal. Eye very large, 2⅔ in head, much longer than snout, larger than in any other Ohio *Cyprinid*. Lateral line much decurved. Color olivaceous, scales above dark-edged; sides and below bright silvery. Length 5 inches.

Two specimens from the Maumee river at Antwerp, Kirsch, 1893.

* **Notropis jejunus** (Forbes).

Head 4; depth 4⅔; eye 3⅔ in head, equal to snout, less than interorbital space. D. 8; A. 7; scales 5-37–3; teeth 2, 4–4, 1. Body moderately slender; head flattish above; snout blunt and rounded. Dorsal over ventrals; about 16 scales before dorsal. Color, pale olivaceous above, pale on sides and below, with a broad silvery band overlying a plumbeous shade. Length 3 inches.

The range of this species in the state seems to be limited to the Ohio river and the lower portions of its tributaries. Hamilton County, "common in Little Miami river and Bloody Run, Henshall, 1888; common in the Ohio river and Ice creek at Ironton and in John's creek at Waterloo, R. C. Osburn, 1899.

Notropis atherinoides Rafinesque.

Head 4⅔; depth 5½; eye 3¼. D. 8; A. 11; scales 5–38–3, 15 before dorsal; teeth 2, 4–4, 2. Body long and slender, compressed, back not elevated. Head blunt, conic, shorter than in related species. Mouth moderate, very oblique, upper lip on a level with upper part of pupil. Eye large, rather longer than snout. Fins low, front of dorsal midway between point of snout and base of caudal. Lateral line decurved. Color above clear, translucent olive-green, a yellow, iridescent vertebral line in life, which becomes darker in spirits; sides bright silvery, with sometimes a brassy lateral shade; breeding males with snout rosy. Length 4 to 6 inches.

* *Notropis scabriceps*, given by Jordan in the Ohio Rept., is confused probably with *N. shumardi*. *N. scabriceps* has not been noticed outside of the Kanawha river. (See Bull. 47, U. S. Natl. Mus.)

An elegant and graceful species, common and widely distributed, found in all larger streams, usually on gravelly or sandy bottom, and in lakes under the same conditions. Recorded for the state by Kirtland as *Minnilus dinemus*. "Exceedingly common in Lake Erie, and throughout the state one of the most abundant of minnows," Jordan (Ohio Rept.); Hamilton County, "common in Clough creek," Henshall, 1888; Lorain County, "very abundant at times," McCormick, 1892; Maumee river at Cecil, Grand Rapids and Toledo, St. Joseph river at Edgerton, Tiffin river at Brunersburg, Auglaize river at Wapakoneta and Cloverdale, "not common at any of these places," Kirsch, 1893; Franklin County, common in all of the larger streams, Williamson and Osburn, 1897; Knox County, "abundant in Big Jelloway creek," Parker, Williamson and Osburn, 1898; Ohio river at Ironton, Sandusky Bay, Lake Erie at Sandusky, Ashtabula creek, Wabash river at Celina, Stillwater creek at Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Cuyahoga river at Hawkins, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon creek at Bellaire, Licking reservoir, R. C. Osburn, 1900.

Notropis arge (Cope).

Head 4¼; depth 6; eye 2¾ to 3. D. 8; A. 11; scales 5–39–3. Close to *N. atherinoides*, but the eye very large, longer than snout; lateral line nearly straight, head large, the snout not very blunt; mouth large, chin projecting. Color pale-greenish olive; a dark vertebral line; belly and sides pale; a broad, silvery lateral band bounded by a dark line. Length 3½ inches. "Apparently varying into *N. atherinoides*, hence of doubtful validity."

This species has been taken at such points in the state as to indicate a wide distribution, but it is not generally common. Hamilton County, "common in east fork of Mill creek," Henshall, 1888; Lorain County, "in company with *N. atherinoides*, but not nearly as common," McCormick, 1892; Maumee river at Grand Rapids, St. Joseph river at Edgerton, Tiffin river at Brunersburg, scarce, Kirsch, 1893; Cuyahoga river at Hawkins, rare, R. C. Osburn, June 25, 1900.

Notropis rubrifrons (Cope).

Head 4 to 5' depth 4¾ to 5½. D. 8; A. 10; scales 5 or 6-39 or 40-3, 15 to 17 before dorsal (Ohio specimens run a little higher, some having as high as 20 before the dorsal); teeth 2, 4-4, 2. Body moderately elongate, back scarcely elevated, head conic and rather pointed. Eye moderate, usually shorter than snout. Resembling *N. atherinoides*, from which it can be readily told, in Ohio specimens at least, by the position of the dorsal fin, which is inserted nearer to base of caudal than to point of snout. Above clear olive, each scale dark-edged; sides and under parts silvery; a narrow, coppery lateral band in life, overlying dark pigment; a narrow vertebral line; a row of black dots on either side of anal fin. Males in spring with head and anterior parts reddish, and sometimes the bases of dorsal, ventral and pectoral fins red. Length 2¾ inches.

A common and widely distributed species, found in company with *N. atherinoides*, but much more common. Kirsch and McCormick record it under the name *N. dilectus* (Girard), but *N. dilectus*, as now restricted, is found farther southwest, so I include these records under *N. rubrifrons*. Possibly the two may not be distinct. Given by Jordan as abundant in southern Ohio; Hamilton County, "common in east fork of Mill creek," Henshall, 1888; Lorain County, "common in the lake and lower parts of all streams entering it," McCormick, 1892; St. Joseph river at Edgerton, Blanchard river at Findlay, Beaver creek at Grand Rapids, "common at these places," Kirsch, 1893; Franklin County, "all larger streams with *N. atherinoides*, abundant where found," Williamson and Osburn, 1897; Knox County, Big Jelloway creek and several of its tributaries, occasionally observed in large schools over clear, gravelly places in ripples, females with ripe eggs on May 24, Parker, Williamson and Osburn, 1898; Ohio river at Ironton, Huron river at Milan, Sandusky Bay, Lake Erie at Sandusky, Ashtabula creek, Wabash river at Celina, Stillwater and Wolf creeks at Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Niggermill Run and Mahoning river, E. B. Williamson, 1900; Cuyahoga river at Kent and Hawkins, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon's Run at Bellaire, outlet of Licking reservoir, R. C. Osburn, 1900.

Notropis umbratilis lythrurus (Jordan). REDFIN.

D. 7; A. 11; teeth 2, 4-4, 2; scales 9-45-3, crowded anteriorly. Head pointed, about 4 in length; body moderately elongated, compressed, depth 4 to 5. Eye 3½. Color bright steel-blue above, pale below. Dorsal fin with a conspicuous black spot at base in front. Breeding males have the lower fins bright red. Females and young paler. Length 3 inches.

An exceedingly handsome species, especially during the breeding season. Widely distributed and generally common. Recorded for the state by Kirtland as *Semotilus diplema*. Jordan gives it under the name *Lythrurus diplaemius* as "abundant throughout the state, especially in the southern part"; Henshall, Kirsch and McCormick record it under the name *N. ardens;* "abundant in all streams examined," in Hamilton County, Henshall, 1888; "found at all points explored in Maumee river system in Ohio except Maumee river at Cecil and Toledo, St. Joseph river at Edgerton and St. Mary's river at Rockford, Kirsch, 1893; Lorain County, "not very common, Black river and Vermillion river near Klipton," McCormick, 1892; Franklin County, "all streams but the smallest, abundant," June 15 given as a breeding date, Williamson and Osburn, 1897; Ice creek at Ironton, Huron river at Milan, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks at Dayton, North Fork of Licking river at Newark; exceedingly abundant in a small tributary of Ashtabula creek, in company with *Abramis crysoleucas*, R. C. Osburn, 1899; Niggermill Run at Salem, E. B. Williamson, 1900; Breakneck creek near Kent, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon creek at Bellaire, R. C. Osburn, 1900.

Genus: ERICYMBA.

Ericymba buccata (Cope). SILVERY-JAWED MINNOW.

Head 8½ to 4; depth 4½ to 5; eye 4 to 4½. D. 8; A. 7; scales 4 or 5-34-3, about 15 in front of dorsal; teeth 1, 4-4, 1 or 1, 4-4, 0, the inner slender and without grinding surface. Body rather elongate, little compressed, back not elevated. Head long, depressed above, with broad and prominent muzzle. Mouth small, horizontal, sub-inferior, lower jaw the shorter. Interopercle, suborbital and dentary bones containing mucous cavities,

which are visible externally. Color olivaceous above, pale and silvery on sides and below; a dark vertebral line and sometimes an indistinct, dark lateral band. Fins all plain. Length 3 to 5 inches.

Distributed throughout the state, a very common species, less abundant in the lake than in the Ohio river drainage. "Abundant in most streams tributary to the Ohio," Jordan's Report; Hamilton County, "abundant in Little Miami river and tributaries," Henshall, 1888; Lorain County, "taken once in Black river," McCormick, 1892; the Maumee river system in Ohio except at the following places: Maumee river at Cecil, Tiffin river at West Unity and Brunersburg, Auglaize river at Wapakoneta and Lost creek at Lima, Kirsch, 1893; Franklin County, every stream, generally abundant, June 15 given as a breeding date, Williamson and Osburn, 1897; Big Jelloway creek system, Knox County, "taken in every stream, abundant," Parker, Williamson and Osburn, 1898; Ohio river and Ice creek at Ironton, Huron river at Milan, Wabash river at Celina, Stillwater and Wolf creeks at Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Niggermill Run and Mahoning river, E. B. Williamson, 1900; Cuyahoga river at Hawkins, Chippewa lake, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon's Run at Bellaire, Licking reservoir, R. C. Osburn, 1900.

Genus: RHINICHTHYS.

Key to Species.

A. Snout long and prominent, projecting much beyond the mouth, barbel evident, no distinct, black lateral band.— *cataractæ.*

AA. Snout shorter, little projecting, barbel small, but always present; a distinct, black lateral band.— *atronasus.*

Rhinichthys cataractæ (Cuvier and Valenciennes).
LONG-NOSED DACE.

Head 4; depth 5; eye 2 in snout, 5 in head. D. 8; A. 7; scales small, 14-65-8; teeth 2, 4-4, 2. Resembling *R. atronasus*, from which it is distinguished by the longer head, by the prominent overhanging muzzle, much longer than in *atronasus*, by the longer barbels and by the absence of a distinct, dark lateral band. Color dark-brownish olive above, sometimes slightly mottled; paler below; a dark spot on opercle, but no distinct band through eye or along side. Length 5 inches.

Apparently a rare species in Ohio. Dr. Jordan (Ohio Rept.) says: "It is found in the tributaries of Lake Erie and even in the lake itself. It also occurs in the southeastern part of the state." Since then it has not been noticed by any other collector, and the writer has taken it but once, a single specimen from a small tributary of the Grand river near Painesville, August 2, 1900.

Rhinichthys atronasus (Mitchill). BLACK-NOSED DACE.

Head 4; depth 4½; eye 1½ in snout, 4½ in head. D. 7 or 8; A. 7; scales 10-65-6; teeth 2, 4–4, 2. Body moderately elongate, little compressed. Head moderate, rather broad and flattish above; snout moderate; mouth horizontal, lower jaw included; barbels well marked in all Ohio specimens examined. Color above dark-yellowish olive, much blotched with black; a black lateral band passing forward through eye to snout; breeding males have the lateral band and the lower fins bright orange or crimson. All color markings less evident in females and young, but the lateral, dark band always present.

Distributed over the state and generally common or even abundant in suitable localities. It is essentially a "brook" species, being rarely found in larger streams, but swarming in clear, cold spring runs, in company with *Chrosomus erythrogaster*. Hamilton County, "common in all the streams," Henshall, 1888; Lorain County, "Spring brook and Chance creek, not common," McCormick, 1892; Maumee river system, "several from Lost creek near Cecil, by Prof. Meek, found nowhere else" (in Ohio), Kirsch, 1893; Franklin County, Grant's Run and Plum Run, common, Williamson and Osburn, 1897; Knox County, Little Jelloway creek, Parker's Run, Joe Sapp Run and Shadley Run, tributaries of Big Jelloway creek, common or abundant, May 24 given as a breeding date, Parker, Williamson and Osburn, 1898; Ohio river at Ironton, Huron river at Milan, Wabash river at Celina, Wolf creek at Dayton, North Fork of Licking river at Newark, in all of these cases the species has been taken in small nameless tributaries rather than in the main stream, with the exception of Wolf creek and the Ohio river, R. C. Osburn, 1899; Cuyahoga river at Kent and Hawkins, and Breakneck creek near Kent, R. C. Osburn, 1900.

Genus: Hybopsis.

Key to Species.

A. Mouth inferior, horizontal, color silvery.
  B. Teeth one-rowed, 4-4.
    C. Eye 3¼ in head; no plumbeous blotches along lateral line.—*hyostomus.*
    CC. Eye very large, 2¾; an interrupted plumbeous lateral band.—*dissimilis.*
  BB. Teeth two-rowed, 1, 4-4, 1, or 1, 4-4, 0.
    D. Sides with a dusky lateral band.— *amblops.*
    DD. Sides silvery, no lateral band.— *storerianus.*
AA. Mouth large, nearly terminal; eye small; not silvery.— *kentuckiensis.*

Hybopsis hyostomus (Gilbert).

Head 4; depth 5½; eye 3¼. D. 8; A. 8; scales in lateral line 37, 13 before dorsal. Body and head very slender; snout long, acute, projecting beyond mouth for half its length; mouth short, wide, inferior; barbels long. Color silvery, everywhere dusted with fine, dark specks. Length 2½ inches.

Very rare in the state, and, as far as my knowledge goes, confined to the Ohio river. Dr. Henshall recorded it first from the Ohio river at Raccoon Island, 1889, and the writer has taken it twice in the Ohio, at Ironton, May 31, 1899, and at Bellaire, August 31, 1900.

Hybopsis dissimilis (Kirtland). Spotted Shiner.

Head 4½; depth 5. D. 8; A. 7; teeth 4-4; scales 6-40 to 47-5, about 20 in front of dorsal. Body long and slender, little compressed, with long caudal peduncle. Head long, flattish above; snout somewhat bluntly decurved, a little projecting; mouth small, horizontal, lower jaw included; barbel smaller than in *H. amblops;* eye about 3 in head, somewhat directed upward. Color above dusky or olivaceous, somewhat mottled; sides silvery, with a bluish lateral band, which is sometimes widened into several blackish blotches. In full coloration, one of the most striking of our Minnows.

This species has been taken in a number of localities in Ohio, and in both the lake and Ohio river drainage, but is nowhere common. Recorded by Kirtland for the Mahoning river and Lake Erie near Cleveland; Hamilton County, "rather common in Little Miami river and O'Bannon creek," Henshall, 1888; Franklin County, "Big Walnut creek, rare," Williamson and Osburn, 1897; Stillwater creek near Dayton, rare, R. C. Osburn, 1899; Cuyahoga river at Hawkins, R. C. Osburn, 1900.

Hybopsis amblops (Rafinesque). Silver Chub.

Head 4; depth 4½ to 5; eye 3. D. 8; A. 7 or 8; scales 5–38–4, about 14 before dorsal; teeth 1, 4–4, 1. Body rather slender, little compressed, rather heavy anteriorly. Head large, flattened and broad above; mouth subinferior, horizontal; barbel evident. Lateral line somewhat decurved. Color above clear translucent green, scales dark-edged; sides with a broad, silvery lateral band, overlying dark pigment, which sometimes appears as a dark lateral band; a dark band through eye around snout. Fins all plain. Length about 3 inches.

Common or abundant throughout the state, found in nearly all streams, but not taken in lakes. Recorded by Kirtland. Given by Jordan as abundant in tributaries of the Ohio; Hamilton County, "common in Little Miami river," Henshall, 1888; Lorain County, "common in some of the streams," McCormick, 1892; Maumee river system, "all the smaller tributaries," Kirsch, 1893; Franklin County, common in all but the smallest streams, Williamson and Osburn, 1897; Big Jelloway creek, Knox County, abundant, Parker, Williamson and Osburn, 1898; Ohio river at Ironton, John's creek at Waterloo, Huron river at Milan, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, North Fork of Licking river near Newark, R. C. Osburn, 1899; Cuyahoga river at Hawkins, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon's creek at Bellaire, R. C. Osburn, 1900.

Hybopsis storerianus (Kirtland).

Head 4½; depth 4; eye 3, equal to snout. D. 8; A. 8; scales 5-42-4. Body elongate, somewhat compressed, the back somewhat elevated. Head short, compressed; preorbital bone large and silvery; mouth horizontal, lower jaw included; barbels conspicuous. Lateral line somewhat decurved. Dorsal inserted over ventrals, ventrals not reaching vent, caudal long, deeply forked. The teeth are said to be usually 1, 4–4, 0, but all Ohio specimens examined have the teeth 1, 4–4, 1. Translucent greenish above, elsewhere bright silvery, sides with a slight plumbeous lateral band, no caudal spot. Length 5 to 10 inches.

Apparently not well distributed over the state, though occurring in both the Lake Erie and the Ohio river drainage. Lake Erie, Kirtland; "abundant in Lake Erie," Jordan; Hamilton

County, "common in Little Miami river and Clough creek," Henshall, 1888; Lorain County, Beaver creek and Lake Erie, McCormick, 1892; Lake Erie near Sandusky, R. C. Osburn, 1900. Dead ones are frequently thrown upon the beach by the waves at Sandusky; not noticed in Sandusky Bay.

Hybopsis kentukiensis (Rafinesque). HORNY-HEAD; RIVER CHUB; JERKER; INDIAN CHUB.

Head 3¾ to 4; depth 4 to 4¼; eye 5¼. D. 8; A. 7 or 8; scales 6–41–5, about 18 before dorsal; teeth 1, 4–4, 1 or 1, 4–4, 0, sometimes 4–4, in all Ohio specimens examined they are 1, 4–4, 1. Body rather robust, little elevated, little compressed. Head large, broadly rounded above; snout conical, bluntish; mouth large, nearly terminal; barbel evident. Dorsal inserted slightly behind ventrals. Color dusky or bluish or greenish olive above, sometimes with brassy luster, pale but not silvery below; sometimes with a clear, grass green lateral band in life; fins all plain, tinged with dull orange. Breeding males have the belly tinged with rosy, and a crimson spot on side of head behind eye, and have the top of the head swollen into a crest which is covered with tubercles. Young with dark caudal spot. Length 6 to 9 inches.

Well distributed over the state and generally common. Recorded by Kirtland. "Every stream in the state of Ohio," Jordan; Hamilton County, "Little Miami river," Henshall, 1888; Lorain County, "very common in larger streams," McCormick, 1892; Maumee river system in Ohio, "every point in every stream examined," Kirsch, 1893; Franklin County, common in larger streams, July 16 given as breeding date, Williamson and Osburn, 1897; Big Jelloway creek system, Knox County, abundant, May 23 noted as a breeding date, Parker, Williamson and Osburn, 1898, Ohio river at Ironton, Huron river at Milan, Ashtabula creek at Ashtabula, Wabash river at Celina, Stillwater and Wolf creeks at Dayton, North Fork of Licking River at Newark, R. C. Osburn, 1899; Cuyahoga river at Kent and Hawkins, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river at Bellaire, R. C. Osburn, 1900.

Genus: EXOGLOSSUM.

Exoglossum maxillingua (Le Sueur). CUT-LIPS; NIGGER CHUB.

Head 4; depth 4½. D. 8; A. 7; scales 8–53–5; teeth 1, 4–4, 1. Body rather stout, little compressed. Head broad and flattish above, with tumid cheeks. Mouth peculiar, the mandible being contracted and incurved, its

outline 3-lobed; this appearance is due to the fact that the dentary bones lie close together, parallel, and are united throughout their length, instead of forming an arch as in all other *Cyprinidæ;* lower lip represented by a broad, fleshy lobe on either side of the mandible. Color olivaceous, smoky or dark above; a blackish bar behind opercle, and a dusky shade at base of caudal in young. Fins all plain. Length 6 inches.

Rare in Ohio. Six specimens were taken by the writer in Stillwater creek near Dayton, Aug. 15, 1899. The range of the species is to the eastward. West of the Alleghenies it has heretofore been known only from the Kanawha river, West Virginia.

Order: APODES.

Sub-Order: ENCHELYCEPHALI.

Family: ANGUILLIDÆ.

Genus: ANGUILLA.

Anguilla chrysypa Rafinesque. AMERICAN EEL; FRESHWATER EEL.

Body elongate, compressed behind; appearing scaleless, but covered with fine, imbedded scales. Head long, conical, moderately pointed. Dorsal and anal fins confluent with caudal. Color brown, often tinged with yellowish; paler below, the color quite variable. Length 4 or 5 feet.

The Eel appears to be nowhere very common in Ohio, but is widely distributed throughout the state, and probably occurs in every lake, reservoir and large stream. Rafinesque mentions its occurrence in the Ohio "as far as Pittsburg;" Kirtland records it for the Ohio river drainage; Lake Erie and Ohio river, Henshall, 1889; Lorain County, "occasionally taken in the pounds," McCormick, 1892; Maumee river at Defiance, "said to inhabit all waters of the Maumee basin," Kirsch, 1893; Franklin County, observed in Big Walnut creek, reported by fishermen as "not rare," Williamson and Osburn, 1897; Pippin lake and Chippewa lake, R. C. Osburn, 1900. I have seen specimens taken in Licking reservoir, Licking river and North Fork of Licking river. According to Kirtland the Eel did not formerly inhabit the Lake Erie drainage, but if not, it has found its way there through the canals.

Order: ISOSPONDYLI.

Family: HIODONTIDÆ.

Genus: HIODON.

Key to Species.

A. Belly in front of ventrals carinated; dorsal with 9 developed rays.— *alosoides.*
AA. Belly in front of ventrals not carinated; dorsal of 11 or 12 developed rays.—*tergisus.*

Hiodon alosoides (Rafinesque).

Head 4½; depth 3½; eye 3½. D. 9; A. 32; scales 6–56–7. Body closely compressed, becoming deep in the adult, the ventral edge everywhere carinated. Maxillary reaching middle of eye. Caudal peduncle rather stouter than in *H. tergisus*, and the fin not so deeply forked; also, the pectorals are longer and the ventrals shorter than in *H. tergisus*. Color bluish, sides silvery, with golden luster. Length 12 inches.

Rare in Ohio, the range of the species being farther to the west. A single specimen, taken in a fisherman's net in the Ohio river, was recorded by Henshall for Hamilton County, 1888.

Hiodon tergisus Le Sueur. MOON EYE; TOOTHED HERRING.

Head 4⅓; depth 3; eye 3. D. 12; A. 28; scales 5–55–7. Body oblong, moderately compressed. Eye large, the maxillary barely reaching its middle. Pectoral fins not reaching ventrals, the latter just short of vent. Belly somewhat carinated behind ventrals only. Color brilliantly silvery, olive-shaded above. Length 12 inches.

This species is confined to Lake Erie and the Ohio river, and the lower courses of their larger tributaries, but it is common where found. Rafinesque made four species of it, and reported two of them for the Ohio as far as Pittsburg. Three of these nominal species, *H. clodalus*, *H. vernalis* and *H. tergisus*, were recognized by Kirtland in his 1838 report, but he afterward dropped all but *H. tergisus*. "Common in the Ohio," Henshall, 1888; Lorain County, "common in the lake, ascending the streams sometimes," McCormick, 1892; "below the dams in the Maumee river at Defiance and Grand Rapids, at both places they were very abundant," Kirsch, 1893; Ohio river at Bellaire, R. C. Osburn, 1900.

Family: DOROSOMIDÆ.

Genus: DOROSOMA.

Dorosoma cepedianum (Le Sueur). GIZZARD SHAD.

Head 4⅓; depth 2½; eye 4½. D. 12, its last ray prolonged and filiform, about as long as head; scales 56-23. Body deep, compressed, the back elevated in adult; belly compressed to an edge, serrated and covered by scutes, 17 in front of vent, 12 behind. Mouth small, inferior, no teeth. An adipose eyelid. No lateral line. Stomach short, muscular, like the gizzard of a fowl. Caudal fin widely forked, lower lobe the longer. Color silvery-bluish above; young with a round, dark spot at shoulder; tips of ventrals and edge of anal often dusky. Length 15 inches.

This handsome, worthless species is now well distributed over the state in the lake and larger streams, although it is said that previous to the opening of the canals it was not found in the lake drainage. The form resident in the Mississippi valley is known as var. *heturum*. Given by Kirtland as *Chatoessus ellipticus*. Ohio river, Lake Erie and Licking reservoir, Jordan's Report; Hamilton County, "very common in the Ohio river," Henshall, 1888; Lorain County, "quite common in the lake and ascending the rivers," McCormick, 1892; Maumee river at Defiance and Grand Rapids, St. Mary's river at St. Mary's and Rockford, Tiffin river at Bruncrsburg, Auglaize river at Cloverdale, Oakwood and Defiance, Hoaglin creek near Oakland and Gordon creek near Cecil, Kirsch, 1893; abundant in St. Mary's reservoir and in the wasteway of the St. Mary's reservoir into the headwaters of the Wabash river at Celina, R. C. Osburn, 1899; Chippewa lake, Ohio river at Bellaire and Licking reservoir, very abundant at the last place, R. C. Osburn, 1900.

Family: CLUPEIDÆ.

Genus: POMOLOBUS.

Pomolobus chrysochloris Rafinesque. SKIPJACK; BLUE HERRING.

Head 3¾; depth 3¾; eye shorter than snout, large, well covered by an adipose eyelid, 4⅓ in head. D. 16, its posterior ray not prolonged; A. 18; about 52 scales in lateral line. Body elliptical, much compressed; belly compressed to an edge which is covered with scutes, 20 before vent, 13

behind. Head slender and pointed; lower jaw strongly projecting; upper jaw emarginate. Color, brilliant blue above, sides silvery with golden reflections; no dark spot behind opercle. Length 15 inches.

This is a deep water species, common in the Ohio river, and it has made its way through the canals into Lake Erie, where it is now said to be common. Ohio river, "seldom as far as Pittsburg," Rafinesque; "very rare, two specimens seen in Cincinnati market," Kirtland, 1838; Hamilton County, "abundant in Ohio river," Henshall, 1888.

Family: SALMONIDÆ.

Key to Genera.

A. Mouth not deeply cleft; dentition feeble or incomplete, scales large.
  B. Lower jaw short and more or less included, cleft of mouth short.— COREGONUS.
  BB. Lower jaw long, projecting beyond upper, cleft of mouth rather long.— ARGYROSOMUS.
AA. Mouth deeply cleft; dentition strong and complete, scales small.
  C. Vomer with raised crest, which is armed with strong teeth; hyoid bone with a broad band of strong teeth; no bright colors.— CRISTIVOMER.
  CC. Vomer without raised crest; hyoid with weak teeth or none; spotted with red.— SALVELINUS.

Genus: COREGONUS.

Coregonus clupeiformis (Mitchill). COMMON WHITEFISH.

Head 5; depth 3 to 4; eye 4 to 5. D. 11; A. 11; scales 8-74 to 85-9. Body oblong, compressed, always elevated, especially so in adult. Head comparatively small and short; the snout obliquely truncated. Gill rakers numerous, long and slender. Color olivaceous above; sides white, but not silvery; lower fins sometimes dusky. Length 2 feet or more.

In Ohio the Whitefish is found only in Lake Erie, where it occurs in great numbers. It does not ascend streams. Recorded first by Kirtland. "The most important fish of Ohio, both as to quantity taken and quality as food," Jordan's Report; L. Erie, Henshall, 1889; "common in the lake," McCormick, 1892; "west end of Lake Erie," Kirsch, 1893. Great quantities from various parts of the lake are brought into the fish houses at Sandusky.

Genus: ARGYROSOMUS.

Key to Species.

A. Lower jaw projecting; depth in length 4½.— *artedi.*
AA. Jaws about equal; depth in length 3 to 3½.— *tullibee.*

Argyrosomus artedi (Le Sueur). CISCO; LAKE HERRING.

Head 4½; depth 4½; eye 4 to 4½. D. 10; A. 12; scales 8–75 to 90–7. Body elongate, compressed, not elevated. Head compressed, rather long; distance from occiput to snout usually a little less than half the distance from occiput to insertion of dorsal fin. Dorsal fin high, its rays rapidly shortened. Bluish black or greenish above; sides silvery, with dark specks; fins mostly pale, the lower dusky-tinged. Length 1 foot.

In Ohio taken only in Lake Erie, where it is very abundant. Recorded by Kirtland, Jordan and Henshall. Lorain Co., "very abundant, sometimes filling the pound nets almost solid with fish," McCormick, 1892; "west end of Lake Erie," Kirsch, 1893. Brought into Sandusky fish houses in enormous numbers.

Argyrosomus tullibee (Richardson). TULLIBEE; MONGREL WHITEFISH.

Head 4 to 4½; depth 3 to 3⅓; eye 4½, as long as snout. D. 11 or 12; A. 11; scales 8 or 9–67 to 74–8. Body short, deep, compressed, shad-like, dorsal and ventral curves similar. Head conic, compressed; distance from occiput to tip of snout half the distance from occiput to insertion of D. Color bluish above; sides white, punctate with fine dots; each scale with a silvery area, these forming a series of distinct longitudinal stripes. Length 18 inches.

I have seen but one record of this species in Ohio, as follows: "I once received a photograph of a Tullibee from Dr. E. Sterling, of Cleveland. The specimen had been taken in Lake Erie," Jordan's Report.

Genus: CRISTIVOMER.

Cristivomer namaycush (Walbaum). MACKINAW TROUT; GREAT LAKE TROUT; NAMAYCUSH.

Head 4¼; depth 4; eye large, 4½. D. 11; A. 11; lateral line 185 to 205. Body elongate. Head very long and pointed, its upper surface flattened. Mouth very large, the maxillary extending much beyond eye; teeth strong. Caudal fin well forked; adipose fin small. General color dark gray, varying from pale to nearly black; everywhere with rounded, paler spots, which are often reddish tinged; dorsal and caudal reticulate with darker. Length 3 feet.

In Ohio taken only in Lake Erie, does not ascend streams. Kirtland records it for Lake Erie, "a few stragglers are taken." Jordan and Henshall also record it. McCormick says of its occurrence in Lorain County, "very rare, it is almost unknown to the fishermen here, though common in the eastern part of the lake."

Genus: SALVELINUS.

Salvelinus fontinalis (Mitchill). SPECKLED TROUT; BROOK TROUT.

Head 4½; depth 4½. D. 10; A. 9; scales 37–230–30. Body oblong, moderately compressed, not much elevated. Head large, but not very long, the snout bluntish; mouth large, the maxillary reaching more or less beyond eye; eye large. Color above more or less mottled with dark olive or black; sides in life with many red spots; dorsal and caudal mottled or barred with dark; belly in males often more or less red.

The Brook Trout now probably occurs in but one stream in the state, Castalia creek, near Sandusky. In 1838 Kirtland recorded the species as found "in only two streams, a small creek in Ashtabula County, and a branch of the Chagrin river in Geauga County." In 1889 Henshall recorded it for Castalia creek. It still occurs there in numbers under the protection of a fishing club, which, I understand, introduces young fry to keep up the supply.

Order: HAPLOMI.

Family: UMBRIDÆ.

Genus: UMBRA.

Umbra limi (Kirtland). MUD MINNOW.

Head 3¾; depth 4¼. D. 14; A. 8; scales 35–15, soft and leathery; no lateral line. Body oblong, compressed. Head large, shortish, cheeks and opercles and top of head forward to between the eyes, covered with scales. Caudal fin conspicuously rounded. Color dull olive green, with a dark dorsal band and about 14 light vertical bars, less distinct in young. A dark bar at base of caudal. Length 4½ inches.

This species is rare in the Ohio river drainage, but is reported as very common in the northern part of the state. Recorded for streams of northern Ohio by Kirtland; abundant in the northern part of Ohio, Jordan's Report; Lorain County, "very common in sloughs and bayous," McCormick, 1892; Fish creek at Edger-

ton, Lost and Gordon creeks near Cecil, "very common on soft muddy bottom," Kirsch, 1893; a single specimen was taken April 3, 1897, in a small tributary of the Olentangy river at Columbus by Mr. E. B. Williamson and the writer; Niggermill Run at Salem, E. B. Williamson, 1900; abundant in the "Black Channel" in Sandusky Bay, R. C. Osburn, 1900.

Family: LUCIIDÆ.

Genus: LUCIUS.

Key to Species.

A. Opercles entirely scaled, scales in lateral line 105.— *vermiculatus.*
AA. Opercles with the lower half bare of scales.
B. Cheeks entirely scaled, scales in lateral line about 123.— *lucius.*
BB. Cheeks with the lower half bare of scales, scales in lateral line about 150.— *masquinongy.*

Lucius vermiculatus (Le Sueur). LITTLE PICKEREL; GRASS PIKE.

Head long, 3¼ to 3¾ in length of body; depth 5 to 6; eye 6 in head, large. D. 11 or 12; A. 11 or 12; scales 105. Body elongate, somewhat compressed. Opercles and cheeks entirely covered with scales. Color greenish or grayish olive, everywhere reticulated with irregular, light markings; the color extremely variable. Length about a foot.

The Little Pickerel, or "Grass Pike," as it is sometimes called, is common throughout the state in suitable localities. Its favorite haunt is the weedy pond or backwater or overflow pool of some stream, and in such places it is sometimes very abundant. Jordan in his Ohio Report gives it as more abundant in the Ohio river drainage than in that of the lake. "Lake Erie and Maumee river," Henshall, 1889; Lorain County, "common," McCormick, 1892; "common throughout the Maumee basin, all waters examined (in Ohio) except Hoaglin creek," Kirsch, 1893; Franklin County, "of general distribution, abundant in Hell Branch," Williamson and Osburn, 1897; John's creek at Waterloo, Huron river at Milan, Ashtabula creek at Ashtabula, R. C. Osburn, 1899; Sandusky Bay, Breakneck creek near Kent, Licking reservoir, R. C. Osburn, 1900.

Lucius lucius (Linnaeus). PICKEREL; PIKE.

Head 3⅓; depth 5; eye 6⅓ in head. Developed rays of dorsal 16 or 17, of anal 13 or 14; scales 123. Body moderately elongate, back little elevated. Head rather long. Cheeks scaly; the lower half of opercle bare. Color

bluish or greenish gray, with many whitish or yellowish spots arranged somewhat in rows. Dorsal, anal and caudal fins with roundish or oblong, black spots. Length 4 feet.

The Pickerel is said to have been very abundant at one time in all the streams flowing into Lake Erie and somewhat less common in the Ohio river drainage. In the latter it has now, as far as Ohio is concerned, become quite rare, and in the lake drainage, and even in the lake itself, it has noticeably diminished in numbers. Kirtland gives it as "common both to the waters of the Ohio and the lake." Lake Erie and Sandusky river, Henshall, 1889; Lorain County, Lake Erie and Black river, "often killed in the ponds and channels of the snipe ground when they are spawning," McCormick, 1892; St. Joseph river at Edgerton, Tiffin river at West Unity and Brunersburg, Auglaize river at Cloverdale, Kirsch, 1893; Sandusky Bay, R. C. Osburn, 1899; Licking reservoir, a single specimen, 1½ feet in length. R. C. Osburn, 1900.

Lucius masquinongy (Mitchill). MUSKALLUNGE.

Head 3⅔; depth 6; eye 4 to 6 in snout. D. 17; A. 15; scales 150. General form of *L. lucius;* the head proportionately longer. Cheeks and opercles both naked below. Color dark gray, sides in the typical form, *masquinongy*, with round or squarish, blackish spots of varying size on a ground color of grayish silvery; belly white; fins spotted with black. Length 4 to 8 feet.

This magnificent Pike is represented in Ohio by two varieties, as follows: *L. masquinongy* var. *masquinongy*, the typical form, confined to Lake Erie and its tributary rivers, and *L. Masquinongy ohiensis* (Kirtland), confined to the Ohio river and its tributary streams. The variety *ohiensis* is separated from the typical form by the presence of narrow irregular crossbars, formed by the coalescing of spots on the sides. Kirtland records the former for Lake Erie and the Ohio canal near Massilon, 1838, and the latter for the Mahoning river, 1854; Ohio river and Lake Erie, Henshall, 1889; McCormick records the species for Lorain County, and states that it is growing rare, being seldom taken in the pounds; Kirsch, in 1893, speaks in the same strain of their diminishing numbers in Maumee river and the west end of Lake Erie.

Family: PŒCILIIDÆ.

Genus: FUNDULUS.

Key to Species.

A. No broad, black lateral band.
  B. Dorsal fin of 12 or 13 rays.— *diaphanus.*
  BB. Dorsal fin of 7 rays.— *dispar.*
AA. A broad, black lateral band, its ed es notched; dorsal fin of 9 rays.— *notatus.*

Fundulus diaphanus menona (Jordan and Copeland).

Head 3½; depth 5. D. 12; A. 10; scales 48–12. Body rather slender, not elevated, compressed posteriorly. Head flattened above. Fins rather small and low. General color olivaceous, below pale, sides somewhat silvery; back always spotted; sides with about 16 distinct, irregular, dark bands, these often replaced by the same number of shining, silvery bands narrower than the interspaces. Length 3½ inches.

Taken only in the northern part of the state, where in suitable places it is common. "Taken once near Lorain, common near Huron and Put-in-Bay," McCormick, 1892; "Maumee river at Toledo, abundant," Kirsch, 1893; noted commonly by Prof. D. S. Kellicott, E. B. Williamson and the writer in Sandusky Bay in 1896, and again by the writer in 1899 and 1900.

Fundulus dispar (Agassiz).

Head 3¾; depth 3½. D. 7; A. 9; scales 35–10. Body short and deep, much compressed. Head short and very broad, the distance between the eyes above greater than the distance between them below. Snout broadly rounded. Dorsal fin much smaller than anal. Color pale olive, bluish in life; about 10 longitudinal, wavy, brown stripes along sides formed by the dark edges of the scales. Males have these stripes interrupted and have about 9 dark crossbars; a black blotch below eye. Length 2½ inches.

Given for Ohio by Jordan (Ohio Rept.), and Jordan and Evermann (Bull. 47, U. S. Natl. Mus.) Dr. B. W. Evermann, in a recent letter regarding this species, says: "I learned of its occurrence in the Celina reservoir through students of mine who seined there. No record was published, however."

Fundulus notatus (Rafinesque). TOP MINNOW.

Head 4; depth 4½; eye 3. D. 9; A. 11 or 12; scales 34–11. Body slender, compressed posteriorly. Head depressed, rather long, the snout somewhat produced; interorbital space half the length of head. Color olivaceous or brownish olive, with a broad, blackish lateral band from tip of

snout to caudal, this band usually notched above and below, giving it a serrated appearance. A light, translucent spot is conspicuous on the top of the head when the fish is swimming at the surface. Length 2 to 3½ inches.

The Top Swimmer is a common species in suitable localities in the Ohio river drainage, but is rather rare in the tributaries of the lake. Hamilton County, very abundant in Ross lake, Henshall, 1888; Maumee river at Grand Rapids, St. Mary's river at St. Mary's and Rockford, Tiffin river at West Unity and Bruinersburg, Auglaize river at Wapakoneta, Cloverdale, Oakwood and Defiance, Blanchard river at Ottawa, Hoaglin creek at Ottawa, "seemingly scarce at all these points," Kirsch, 1893; Franklin County, of general distribution, abundant in places, Williamson and Osburn, 1897; Wabash river at Celina, Stillwater creek near Dayton, very common, R. C. Osburn, 1899.

Order: HEMIBRANCHII.

Family: GASTEROSTEIDÆ.

Genus: EUCALIA.

Eucalia inconstans (Kirtland). BROOK STICKLEBACK.

Head 3½; depth 4. D. IV–I, 10; A. I, 10. Body moderately elongate, little compressed; caudal peduncle slender, not keeled. Dorsal spines low, subequal, 4 or 5 in number in a right line; a cartilaginous ridge along base of fin; ventral spines short and sharp, serrated. Color, males in spring jet black, tinged with red anteriorly; females and young, olivaceous, mottled and dotted with black. Length 2½ inches.

This species is probably confined to the central and northern parts of Ohio. It is said to be abundant in some localities. Kirtland described the species in 1841, from brooks of Trumbull County; Jordan gives it as "abundant in many streams in northern part of Ohio"; "Castalia creek" near Sandusky, Henshall, 1889; Lorain County, "I have found sticklebacks in but two places," McCormick, 1892; Mr. E. B. Williamson writes me that he has found the species in Niggermill Run at Salem, Columbiana County, 1899.

Order: ACANTHOPTERI.

Sub-Order: SALMOPERCÆ.

Family: PERCOPSIDÆ.

Genus: PERCOPSIS.

Percopsis guttatus Agassiz. TROUT PERCH.

Head 3½ to 4; depth 4 to 4½. D. II, 9; A. I, 7; scales about 50, strongly ctenoid. Head rather long, slender and conical, mouth subinferior. Body rather slender; caudal peduncle long and slender. A small but distinct adipose fin behind dorsal. Color, pale olivaceous on back, colorless and somewhat translucent below; about 11 small, dark spots along lateral line, and another row of smaller dots between this and mid-dorsal line. Length 4 to 6 inches.

Jordan and Evermann (Bull. 47, U. S. Natl. Mus.) in discussing the range of this species give it as "rare in streams south of Lake Erie." This statement does not seem to hold good for the State of Ohio, for in suitable localities the species is common as far as the southern limits of the state, and in some places is very abundant. Hamilton County, "abundant in Little Miami river below the dam at Loveland," Henshall, 1888; Lorain County, "common in Lake Erie, Black river and Beaver creek," McCormick, 1892; Franklin County, taken in most of the streams of the county, abundant in streams west of the Scioto, after some hauls in Scioto Big Run the seine contained more of this than all the other species combined, Williamson and Osburn, 1897; John's creek at Waterloo, Huron river at Milan, common at both places, R. C. Osburn, 1899; Ohio river at Bellaire, R. C. Osburn, 1900.

Sub-Order: XENARCHI.

Family: APHREDODERIDÆ.

Genus: APHREDODERUS.

Aphredoderus sayanus (Gilliams). PIRATE PERCH.

Head 3; depth 3. D. III, 11 to IV, 10; A. II, 6; scales 45 to 60. Body oblong, elevated at base of dorsal, compressed behind. Head thick, depressed; mouth moderate, lower jaw projecting. Lateral line imperfect or wanting. The position of the anus is peculiar, being always anterior; it

varies in position with age from just behind the ventrals in the young, to below the preopercle in the adult. Color, dark olive, profusely speckled with dark points, which may form streaks along the rows of scales; 2 blackish bars at base of caudal. Length 5 inches. The Ohio form is the variety *isolepis*.

The Pirate Perch seems to be a rather rare species in Ohio, and thus far it has been taken only in Lake Erie and the Maumee river system. "Lake Erie," Henshall, 1889; Maumee river system, "only two small specimens were taken, one by Prof. Meek in Gordon creek near Cecil, and one by us in warm sluggish water in St. Mary's river at Rockford," Kirsch, 1893.

Sub-Order: PERCESOCES.

Family: ATHERINIDÆ.

Genus: LABIDESTHES.

Labidesthes sicculus Cope. BROOK SILVERSIDES.

Head 4¼ to 4½; depth 6; eye large, 3½. D. IV–I, 11; A. I, 23; scales 75. Body very long and slender, compressed. Head long, flattened above; snout long, slender and conic; mouth very large, the jaws produced into a sort of beak. First dorsal very low, inserted well back; caudal forked. Color pale olive green, translucent, dotted above with fine, dark specks; a broad, distinct, silvery lateral band, bounded above by a dark line. Length 3½ inches.

This peculiar and interesting little fish is widely distributed over the state and is generally common. Quiet pools of streams and shallow waters of lakes on sandy or gravelly bottom are its favorite haunts. Hamilton County, "one specimen from Bloody Run, common in Ross lake," Henshall, 1888; Lorain County, "quite common in the lake and in the larger streams below the dams," McCormick, 1892; "generally distributed in the waters of the Maumee basin," Kirsch, 1893; Franklin County, generally distributed, abundant, Williamson and Osburn, 1897; Huron river at Milan, Sandusky Bay, Wabash river at Celina, Stillwater creek near Dayton, very abundant on sandy bottom in shallow water in Sandusky Bay, R. C. Osburn, 1899; Mahoning river, E. B. Williamson, 1900; Pippin lake, Chippewa lake, Summit lake, Grand river at Painesville, Chagrin river at Willoughby, Ohio river at Bellaire, Licking reservoir, R. C. Osburn, 1900.

Sub-Order: RHEGNOPTERI.

Group: PERCOIDEA.

Family: CENTRARCHIDÆ.

Key to Genera.

A. Dorsal fin scarcely longer than anal.— POMOXIS.
AA. Dorsal fin much larger than anal.
  B. Body comparatively short and deep, the depth usually more than ⅔ the length.
    C. Tongue and pterygoids with teeth; mouth large, maxillary reaching past middle of eye.
      D. Opercle emarginate behind; anal spines 6.— AMBLOPLITES.
      DD. Opercle ending in a black, convex process or flap; anal spines, 3.— CHÆNOBRYTTUS.
    CC. Tongue and pterygoids toothless; mouth small, maxillary barely reaching past middle of eye.
      E. Supplemental bone of maxillary perfectly distinct.— APOMOTIS.
      EE. Supplemental bone of maxillary rudimentary or wanting.
        F. Lower pharyngeal bones narrow, the teeth usually sharp, not conical.— LEPOMIS.
        FF. Lower pharyngeals broad and concave, especially in the adult, teeth more or less blunt and paved.— EUPOMOTIS.
  BB. Body comparatively elongate, depth in adult about ⅓ the length; mouth large.— MICROPTERUS.

Genus: POMOXIS.

Key to Species.

A. Dorsal spines 6, occasionally 5, rarely 7; profile strongly sinuate, anal fin plain.— *annularis.*
AA. Dorsal spines 7, rarely 8; profile not strongly sinuate; anal fin reticulate with dark markings.— *sparoides.*

Pomoxis annularis Rafinesque. CRAPPIE; LAKE ERIE BASS; CALICO BASS.

Head 3; depth 2⅓; eye large, 4. D. V or VI, or sometimes VII, 15; A. VI, 18; scales 6-48-14. Body elongate, much compressed. Head long; the profile from snout to dorsal strongly sinuate; mouth very wide. Fins very high, but lower than in *P. sparoides*. Color, silvery olive, mottled with dark green, the dark marks chiefly on upper part of body and having a tendency to form vertical bars; dorsal and caudal marked with dark green, anal nearly plain. A lighter colored fish than *P. sparoides*. Quite variable. Length 12 inches.

Well distributed over the state in larger streams and lakes, common. Recorded for the state by Dr. Kirtland, who gave it the name *Cichla storeria*. "It occurs in large numbers in the Ohio river and its tributaries, rarely taken in Lake Erie," Jordan's Report; Muskingum river, Ohio river at Raccoon Island, Henshall, 1889; Lorain County, common, McCormick, 1892;

Franklin County, Scioto river, Olentangy river, Big Walnut creek, Big Darby creek, abundant, Williamson and Osburn, 1897; Ohio river at Ironton, Huron river at Milan, Wabash river at Celina, North Fork of Licking river at Newark, R. C. Osburn, 1899; Ohio river at Bellaire, Chippewa lake, R. C. Osburn, 1900. It is worthy of note that in Chippewa lake, which drains into the Ohio river system, this species was found exceedingly abundant, but none of the next species, *P. sparoides*, were taken, while in Summit lake, with very similar surroundings, but draining into Lake Erie, only *P. sparoides* was taken. These lakes are but a short distance apart, the former being near Medina, the latter at Akron.

Pomoxis sparoides (Lacepede). CALICO BASS; GRASS BASS; LAKE ERIE BASS; CRAPPIE; BACHELOR.

Head 3; depth 2. D. VII or VIII, 15; A. VI, 17 or 18; scales 7–44–12. Body less elongate than in *P. annularis;* the profile less sinuate, the region over the eye not being so much depressed. Fins very high, anal higher than dorsal, its height 4 or 5 times in length of body. Color silvery olive, mottled with olive green or dark, the markings not tending to vertical bars, but to small, irregular groups and covering the whole body. Anal fin heavily marked like the other vertical fins, with dark olive markings; a dusky opercular spot. Length 12 inches.

Not so common as the preceding, but widely distributed, and occurring throughout the state; perhaps not ascending streams as far as *P. annularis*. It is said to be more common than *P. annularis* in the lake drainage, while in the Ohio Valley, *P. annularis* is the more common. "In the Great Lakes in large numbers. I have seen but few from the Ohio Valley," Jordan's Report; Hamilton County, "common in Ross lake near Elmwood," Henshall, 1888; Lorain County, Lake Erie and lower parts of Beaver creek and Black river, McCormick, 1892; Maumee river at Defiance and Grand Rapids; St. Joseph river at Edgerton, Fish creek at Edgerton, St. Mary's river at St. Mary's and Rockford, Tiffin river at Brunersburg and West Unity, Hoaglin creek near Oakland, Kirsch, 1893; Franklin County, Scioto and Olentangy rivers, not common, Williamson and Osburn, 1897; Ohio river at Ironton, Wabash river at Celina, R. C. Osburn, 1899; Summit lake, Ohio river at Bellaire, R. C. Osburn, 1900.

Genus: AMBLOPLITES.

Ambloplites rupestris (Rafinesque). ROCK BASS; GOGGLE-EYE; RED-EYE.

Head 2¾; depth 2 to 2½; eye very large, 3½. D. XI, 10 or 11; A. VI, 10; scales 5 to 7–40–12. Body oblong, compressed. Head large, profile little depressed above eye; mouth large and oblique, lower jaw projecting. Preopercle serrate near its angle. Color olive green, tinged more or less with brassy yellow, with much dark mottling; each scale with a dark spot producing longitudinal rows; a black opercular spot. Soft dorsal, anal and caudal with dark mottlings. Length 12 inches.

A widely distributed and abundant species found in all larger streams and lakes. Recorded by Kirtland as common. Abundant, Jordan's Report; "Lake Erie, Ohio river, near Little Sandy river," Henshall, 1889; Lorain County, "common in the larger streams, sometimes taken by the pound nets in the lake," McCormick, 1892; "A common fish at nearly all points where investigations were made," Maumee river basin, Kirsch, 1893; Franklin County, nearly every stream, common, Williamson and Osburn, 1897; Big Jelloway creek, Knox County, not common, Parker, Williamson and Osburn, 1898; John's creek at Waterloo, Huron river at Milan, Sandusky Bay, Ashtabula creek, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Niggermill Run and Mahoning river, E. B. Williamson, 1900; Pippin lake, Cuyahoga river and Breakneck creek at Kent, R. C. Osburn, 1900.

Genus: CHÆNOBRYTTUS.

Chænobryttus gulosus (Cuvier and Valenciennes). WARMOUTH.

Head 2⅓ to 2⅔; depth 2 to 2½; eye 4 to 4½. The general form and dentition of *Ambloplites*, with the convex opercle, 10 dorsal and 3 anal spines of *Lepomis*. Preopercle entire. Head large, snout about equal to eye; mouth large, maxillary reaching posterior border of eye, teeth on vomer, palatines, pterygoids and tongue. D. X, 9 or 10; A, III, 8 or 9; dorsal spines low. Color dark olive green, clouded with darker, usually with red or blue, and brassy; a dark spot on each scale; belly yellowish or brassy. Length 8 to 10 inches.

Taken by Kirsch in the Maumee basin in Fish creek, at Edgerton, and Tiffin river at Brunersburg, "not common," 1893. Not recorded for the state by any other collector.

Genus: APOMOTIS.

Apomotis cyanellus (Rafinesque). GREEN SUNFISH; CREEK SUNFISH; LITTLE RED-EYE.

Head 3; depth 2½. D. X, 11; A. III, 9; scales about 7-48-17, 8 rows on cheek. Body oblong, rather elongate in young, becoming short and deep in adults. Mouth large, larger than in *Lepomis* or *Eupomotis*, maxillary reaching nearly to middle of eye, lower jaw projecting. Gill rakers long and stiff. Lower pharyngeal teeth acute; a patch of teeth on basibranchial between second and third hypobranchials. Color generally greenish, sometimes nearly black; vertical fins marked with blue or green, in adults in spring the lower fins are very dark and all the fins are edged with silvery; dorsal and anal generally with a black spot on the posterior rays. Quite variable. Length 7 inches.

The Green Sunfish is an abundant resident of the streams of Ohio, but is rarely found in the lakes. It ascends the streams farther than any other species of this family, being found even in small brooks and spring runs. Hamilton County, "abundant in Ross lake and Little Miami river," Henshall, 1888; Lorain County, "abundant in the upper part of small streams and in small ponds," McCormick, 1892; Maumee river basin, "taken at nearly every point in all the streams that were examined," Kirsch, 1893; Franklin County, abundant in nearly every stream, Williamson and Osburn, 1897; Big Jelloway creek, Knox County, not common, Parker, Williamson and Osburn, 1898; Ohio river at Ironton, Huron river at Milan, Ashtabula creek, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Mahoning river, E. B. Williamson, 1900; Breakneck creek near Kent, outlet of Licking reservoir, R. C. Osburn, 1900.

Genus: LEPOMIS.

Key to Species.

A. Pectoral fins short, obtuse, not reaching beyond front of anal, considerably shorter than head.— *megalotis.*

AA. Pectoral fins more or less pointed, not much if any shorter than head, and reaching to or beyond front of anal.

B. Opercular flap margined with red, sides with many red spots.— *humilis.*

BB. Opercular flap without red margin or spot; no red spots on sides, a large spot on posterior rays of dorsal and anal fins at base.— *pallidus.*

Lepomis megalotis (Rafinesque). LONG-EARED SUNFISH.

Head (without earflap) 3 in length; depth 1⅔ to 2½; eye 3½ to 4. D. X, 10 to 12; A. III, 8 to 10; scales about 6–38–12, about 5 rows on cheek. Body short and deep, compressed; the back very strongly arched in adult, the profile very steep. Mouth small, oblique. Gill rakers very short and soft. Dorsal spines very low, 3 in head. Pectoral 1⅓ to 1½ in head. Opercular flap in adult very broad and long, with a pale blue or red margin which may be very broad or almost wanting; the flap much smaller in young. Color brilliant blue and orange; above chiefly blue, the belly entirely orange, lips blue; cheeks orange, with bright blue stripes; soft parts of vertical fins with the rays blue and membranes orange. An extremely variable species. Length 8 inches.

An abundant species in the Ohio river system, but not so common in the lake drainage. It occurs both in lakes and streams, but to greater extent in the latter. It does not ascend streams as far as *Apomotis cyanellus*, however. Given by Kirtland as *Pomotis nitida*. Hamilton County, "abundant in Ross lake," Henshall, 1888; Lorain County, rare, two specimens from Black river, 1890, McCormick; Maumee system, "all the larger streams and nearly all the smaller ones," July 17 given as a breeding date, Kirsch, 1893; Franklin County, nearly all the streams, apparently the most common sunfish, June 18 given as a breeding date, Williamson and Osburn, 1897; John's creek at Waterloo, Huron river at Milan, Ashtabula creek, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Niggermill Run at Salem, E. B. Williamson, 1900; Sandusky Bay, Summit lake, Ohio river at Bellaire, Licking reservoir, R. C. Osburn, 1900.

Lepomis humilis (Girard). RED-SPOTTED SUNFISH.

Head 2¾ to 3; depth 2¼ to 2½; eye large, 3 to 3½. D. X, 10 or 11; A. III, 8 or 9; scales large, 5–34–11, about 5 rows on cheek. Body oblong, profile not very steep. Mucous pores on head very large; opercular flap long, broad and with a very broad, red margin, which entirely surrounds the black. Longest dorsal spine not quite half head, pectoral a little shorter than head. Gill rakers rather long and blunt, well developed. Color, bluish with conspicuous greenish spots posteriorly; sides with many conspicuous round, salmon-red spots; a faint black spot on last rays of dorsal; belly and lower fins red. Length 4 inches.

This small, highly colored sunfish is found in Ohio in the southwestern part only. I know of but one record, as follows: Hamilton Co., "common in Ross lake and Clough creek," Henshall, 1888.

Lepomis pallidus (Mitchill). BLUE-GILL; BLUE BREAM; COPPER-NOSED BREAM; BLUE SUNFISH.

Head 2¾ to 3¼; depth about 2; eye 3½ to 4. D. X, 11; A. III, 10 to 12; scales about 7–45–12, 5 rows on cheek. Body comparatively short and deep, compressed; the young slender, adults nearly orbicular, caudal peduncle rather slender. Head rather small, the projecting snout forming an angle above eye. Mouth quite small, the maxillary barely reaching front of eye. Opercular flap very short in young, somewhat larger in adult, without pale edge. Gill rakers of moderate length, rather stiff. Dorsal fin high; pectoral fin long and narrow, longer than head, reaching past front of anal. Color, olive green, sometimes quite dark, sometimes with a silvery or golden luster. Adults in spring with the belly coppery red. Young, silvery with more or less distinct, chain-like bars of darker on the sides. No blue stripes on cheek; a black blotch at base of posterior rays of dorsal and anal. Extremely variable. Length 12 inches.

The Blue-gill is a very abundant species in the lakes of Ohio. It is quite common and widely distributed in the larger streams, but does not ascend small streams. Hamilton County, "abundant in Little Miami river and Ross lake," Henshall, 1888; Lorain County, "not common," McCormick, 1892; Maumee river system, "taken in all the streams and at nearly every point examined," Kirsch, 1893; Franklin County, Scioto and Olentangy rivers, Big Walnut and Big Darby Creeks, rare, June 14 given as a breeding date, Williamson and Osburn, 1897; Huron river at

(*Lepomis machrochirus* Rafinesque, has been taken in the head waters of the Ohio in western Pennsylvania, by Cope, and in the Ohio river, by Rafinesque and Jordan, but as I know of no record of its capture within the state, I hesitate to include it in the list, though it doubtless occurs rarely in the Ohio.)

Milan, Sandusky Bay, Wabash river at Celina, R. C. Osburn, 1899; I have observed the species also at Licking and St. Mary's reservoirs. In both of these and in Sandusky Bay it is very abundant; Pippin lake, Chippewa lake, Summit lake, Ohio river at Bellaire, R. C. Osburn, 1900.

Genus: EUPOMOTIS.

Key to Species.

A. Cheeks without marked blue or orange spots or lines.
  B. Scales large, 34 to 39 in lateral line.— *heros.*
  BB. Scales moderate, 33 in lateral line. *euryorus.*
AA. Cheeks with wavy blue lines, scales about 45; lower posterior border of opercular flap always scarlet. *gibbosus.*

Eupomotis heros (Baird and Girard).

Head 2⅘ to 3; depth 2 to 2⅔; eye 3½ to 4⅓; snout 3½ to 4. D. X, 11; A. III, 11; scales 4–34 to 39–13, 4 rows on cheek. Appearance of *Lepomis pallidus*. Body robust, moderately elongate, dorsal and ventral outlines about equally curved. Head rather large, a considerable depression in profile above eye; mouth rather large, maxillary reaching past front of eye. Dorsal spines rather high; pectorals reaching beyond middle of anal. Opercular flap smaller than eye, much as in *E. gibbosus*. Pharyngeal teeth not so blunt as in *gibbosus*. Color dark greenish above, gradually becoming brassy on belly; opercular spot greenish black, the flap with a broad, blood-red border in male, plain in females. No spot on dorsal or anal. Length about 8 inches.

This is a species of southern distribution, and in Ohio probably occurs only in the southwestern part of the state. It has been recorded, in 1888, for the Little Miami river in Hamilton County, by Henshall, under the name *Lepomis notatus*.

Eupomotis euryorus (McKay).

Head 3¾; depth 2⅔. D. X, 11; A. III, 10; scales 6–43–14, 6 or 7 rows on cheek. Body very robust, compressed, dorsal outline more convex than ventral; profile steep, convex. Mouth oblique, small, maxillary reaching front of eye. Teeth on front of palatines. Lower pharyngeals with the rather long posterior spur turned up, stoutish; the inner angle rounded, somewhat obtuse. Teeth stout, very much blunted, not close set. Gill rakers short and stout, the inner surface roughened. Opercular flap nearly as long as snout, with a very broad, pale membranous margin. Dorsal spines low; ventrals and pectorals short, reaching vent. Color in spirits, mottled olive, yellowish below; top of head blackish; membranes of vertical fins dusky; ventrals dusky, with lighter margins; pectorals pale. Length 8 inches.

This rare sunfish has been recorded from but two localities in Ohio, both of these to the credit of Mr. McCormick, who says of them: "I took several specimens near Huron, July 6, 1891, and two near Lorain, in September." Only two other specimens were known at the time Mr. McCormick took these.

Eupomotis gibbosus (Linnaeus). COMMON SUNFISH; PUMPKIN SEED; SUNNY.

Head 3 to 3¼; depth 1¾ to 2; eye 4 to 4½; snout 4½. D. X, 10 to 12; A. III, 10 or 11; scales about 6-44-13, 4 rows on cheek. Body short and deep, compressed, the profile steep, convex. Head rather small; mouth small, maxillary scarcely reaching front of eye. Dorsal spines high, the longest 2 to 2½ in head, equal to distance from snout to posterior edge of pupil; pectorals long, as long as head. Gill rakers short and soft, weaker than in any other species except *Lepomis megalotis*. Pharyngeal teeth all bluntly rounded, paved, the bones very broad and somewhat concave. Opercular flap small, the lower posterior part always bright scarlet, a character which distinguishes this species at once in the adult. Color greenish olive, brilliantly marked with blue and orange on the sides; belly orange; lower fins orange, upper blue and orange-spotted; cheeks orange, with wavy blue streaks. One of the most gaudy of our Sunfishes, and quite variable. Length 8 inches.

An abundant species in the ponds and lakes of central and northern Ohio, common in the large streams and in the quiet waters of bayous. Not common in the smaller streams, and said to be rather rare in the southern part of the state. In Sandusky Bay and in Licking reservoir it is the most abundant sunfish. Ross lake, Hamilton County, and Lake Erie, Henshall, 1889; Lorain County, "very abundant below the ripples in the larger streams, and in the bayous near the lake. A few taken in the pounds," Camden lake, McCormick, 1892; Maumee river system, "abundant in all the lakes, common in all the larger streams, except the Auglaize river, less common in the smaller streams," Kirsch, 1893; Franklin County, Scioto and Olentangy rivers, Big Walnut and Big Darby creeks, not common, Williamson and Osburn, 1897; Huron river at Milan, Sandusky Bay, St. Mary's reservoir, Wabash river at Celina, North Fork of Licking river at Newark, R. C. Osburn, 1899; Pippin lake, Chippewa lake, Summit lake, Licking reservoir, abundant in all these localities, R. C. Osburn, 1900.

Genus: MICROPTERUS.

Key to Species.

A. Eleven rows of scales above lateral line, about 17 rows on cheek.— *dolomieu.*
AA. Seven rows of scales above lateral line, about 10 rows on cheek.— *salmoides.*

Micropterus dolomieu Lacepede. SMALL-MOUTHED BLACK BASS.

Head 2½ to 3½; depth 2¾ to 3½; eye 5 to 6½. D. X, 13 to 15; A. III, 10 to 12; scales 11–72 to 85–25 (Ohio specimens average about 75 in lateral line). Body rather elongate in young, becoming deeper with age. Mouth large, but smaller than in *M. salmoides*, the maxillary usually not extending back of posterior edge of orbit. This species can always be distinguished at once from *M. salmoides* by the smaller scales, there being 11 rows of scales above the lateral line, while in *salmoides* there are but 7 rows. The color is exceedingly variable, giving rise to a number of local names among sportsmen. The usual color is a dark green, with bronze or golden reflections, sometimes almost black on the back; belly lighter. A lateral band never present. Said to reach a length of 2 feet.

Widely distributed over the state and common everywhere in suitable localities. Dr. Jordan aptly says in regard to its habits, "as compared with *M. salmoides* it is a fish of the running waters, having little liking for warm and grassy ponds, bayous or lakes." It is found in nearly all streams, sometimes even ascending small, spring-fed brooks. Recorded by all students of Ohio fishes from Rafinesque and Le Sueur on down, and under a great variety of names. I give the locality records of later investigators. Hamilton County, "common in Little Miami river," Henshall, 1888; Lorain County, "common in the larger streams, not so often seen in the lake as the next species," McCormick, 1892; Maumee river system, "common in all the streams, none from the lakes," Kirsch, 1893; Franklin County, generally abundant, Williamson and Osburn, 1897; Big Jelloway creek system, Knox County, nearly all streams, abundant in some places, Parker, Williamson and Osburn, 1898; John's creek at Waterloo, Ice creek at Ironton, Huron river at Milan, Sandusky Bay, Ashtabula creek, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Mahoning river, E. B. Williamson, 1900; Cuyahoga river at Hawkins, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon creek at Bellaire, Licking reservoir, R. C. Osburn, 1900.

Micropterus salmoides (Lacepede). LARGE-MOUTHED BLACK BASS; OSWEGO BASS; GREEN BASS; BAYOU BASS.

Head 3 to 3½; depth 3 to 3¼; eye 5 to 6. D. X, 12 or 13; A. III, 10 or 11; scales 7–65 to 70–18. Body much as in *M. dolomieu*, ovate-fusiform. Mouth very large, maxillary (except in very young) reaching past eye. Always distinguishable from *M. dolomieu* by the larger scales, 7 rows above lateral line. Color variable, usually dark green above, becoming greenish silvery on sides and belly. Young always with a distinct, black lateral band, which becomes fainter with age and disappears entirely at about the fourth year. Length 1½ to 2½ feet.

This species is found in lakes, bayous and in channels of larger streams. It is a fish of the quiet water. Widely distributed. Like the preceding species it has been the subject of much synonymy. Rafinesque records it under the name *Lepomis pallida*, for the Ohio, Miami and Hocking rivers. Hamilton County, "common in Ross lake," Henshall, 1888; Lorain County, "more common in the lake than in the streams," McCormick, 1892; Maumee river system, common in all the lakes, also common in the Maumee river and most of its larger tributaries, but none in Auglaize river or its tributaries, Kirsch, 1893; Franklin County, Scioto river, Big Walnut creek, Big Darby creek, not common, Williamson and Osburn, 1897; Ohio river and Ice creek at Ironton, John's creek at Waterloo, Huron river at Milan, Sandusky Bay, Wabash river at Celina, R. C. Osburn, 1899; Pippin lake, Chippewa lake, Summit lake, Grand river at Painesville, Licking reservoir, R. C. Osburn, 1900.

Family : PERCIDÆ.

Key to Genera.

A. Pseudobranchiæ well developed; preopercle serrate; branchiostegals 7; no anal papilla.

B. Canine teeth on jaws and palatines; body elongate; ventral fins well separated.— STIZOSTEDION.

BB. Canine teeth none; body oblong, ventral fins near together.— PERCA.

AA. Pseudobranchiæ imperfect or wanting; preopercle entire or nearly so; branchiostegals 6; anal papilla usually present.

C. Parietal region of skull depressed, not strongly convex in transverse section, ⌒-shaped in section.

D. Cranium broad between the eyes, snout conic, projecting pig-like beyond the inferior mouth.— PERCINA.

DD. Cranium not broad between the eyes, snout not much projecting.

E. Body not hyaline nor extremely elongate, its surface almost entirely covered with scales.

F. Premaxillaries not protractile, the skin of the premaxillary continuous in the middle with that of the forehead with no cross groove between.— HADROPTERUS.

FF. Premaxillaries protractile (in *Cottogaster shumardi* a narrow, connecting frenum sometimes crosses from the premaxillary to the forehead).

G. Anal spines 2, both well developed, the first usually the longer.

H. Mid-line of belly naked or covered by caducous shields; gill membranes scarcely connected — COTTOGASTER.

HH. Belly covered with ordinary scales; gill membranes broadly connected.— DIPLESION.

GG. Anal spine single, obscure; anal fin small, much shorter than soft dorsal.— BOLEOSOMA.

EE. Body extremely elongate, hyaline, subterete, the belly mostly naked.

I. Premaxillaries not protractile; dorsal spines 12 or 13.— CRYSTALLARIA.

II. Premaxillaries protractile; dorsal spines 9 to 11.— AMMOCRYPTA.

CC. Parietal region of skull not depressed, more or less strongly convex in cross-section, ∩-shaped; premaxillaries never protractile; belly covered with ordinary scales.

J. Lateral line straight; body rather robust.— ETHEOSTOMA.

JJ. Lateral line with a slight arch running high anteriorly; body slender.— BOLEICHTHYS.

Genus: STIZOSTEDION.

Key to Species.

A. Pyloric coeca 3; soft dorsal with about 20 rays; a black spot on last dorsal spines.—*vitreum.*

AA. Pyloric coeca 4 to 7; soft dorsal with about 17 rays; no black spot on posterior dorsal spines, a black blotch at base of pectoral: second dorsal with rows of dark spots.—*canadense.*

Stizostedion vitreum (Mitchill). WALL-EYED PIKE; PIKE PERCH; YELLOW PIKE; BLUE PIKE; JACK SALMON.

Head 3⅔; depth about 4½; eye 4½ to 5. D. XII to XVI, 19 to 21; A. II, 12 to 14; scales 10–110 to 132–25; lateral line incomplete. Body slender, becoming compressed with age. Cheeks and upper surface of head nearly naked. Dorsal spines high, more than one-half the length of head; dorsal fins well separated; soft dorsal nearly as long as the spinous. Pyloric coeca, 3. Color, dark olive, finely mottled with brassy; sides of head more or less vermiculated; belly and lower fins pinkish; spinous dorsal with a large, jet black spot on posterior 2 or 3 membranes. Length about 3 feet.

Common in Ohio river and Lake Erie, and sometimes ascending their larger tributaries. Kirtland reported it from Lake Erie and the Maumee and Ohio rivers under the name *Lucio-perca americana*. Hamilton County, "abundant in the Ohio river," Henshall, 1888; Lorain County, "very common in the lake, entering the streams occasionally," McCormick, 1892; Maumee river at Grand Rapids and Toledo, and Lake Erie around the mouth of the Maumee in large numbers, Kirsch, 1893; Huron river at Milan, Sandusky Bay, R. C. Osburn, 1899.

Stizostedion canadense griseum (De Kay). SAUGER; SAND PIKE; GRAY PIKE; PICKERING.

Head 3½; depth varying with age, 4½ to 6; eye 5. D. XI to XV–I, 17 to 19; A. II, 11 or 12; scales 9–100 to 125–27; lateral line incomplete. Body more terete than in *S. vitreum*. Head depressed, pointed; opercular spines fewer than in the typical *S. canadense*, and the head less completely scaled. Color, olive gray, sides brassy or orange, with dark mottlings; spinous dorsal with 2 or 3 rows of irregular, dark spots, no large, black spot on posterior rays. A more translucent fish than *S. vitreum*. Pyloric coeca 4 to 7. Length about 18 inches.

Distributed about as the preceding species. Common both in the lake and Ohio river. "Abundant in the Great Lakes, plentiful in Ohio river," Jordan's Report; Hamilton County, "common in the Ohio river," Henshall, 1888; Lorain County, "common in the lake, entering streams oftener than *S. vitreum*,"

McCormick, 1892; Maumee river at Grand Rapids, Waterville and Toledo, Blanchard river at Ottawa, west end of Lake Erie, Kirsch, 1893. I have seen many dead ones on the lake beach at Sandusky.

Genus: PERCA.

Perca flavescens (Mitchill). YELLOW PERCH; RINGED PERCH.

Head 3¼; depth 3¼. D. XIII to XV–II, 13 to 15; A. II, 7 or 8; scales 7-74 to 88–17; lateral line incomplete. Body slender in young, becoming stouter with age; adults have the back considerably arched, the profile convex from dorsal to occiput, thence concave forward to the projecting snout. Cheeks closely scaled; well developed striae on operculars and rugosities on top of head. Color, dark olivaceous above, sides golden yellow, with 6 or 8 broad, dark vertical bars; belly pale, lower fins red or orange. Length 1 foot.

A fish of the quiet waters, found abundant in the reservoirs, ponds, bayous and lakes of central and northern Ohio, but not recorded for the southern part of the state. Kirtland recorded it (*Bodianus flavescens*) as abundant in Lake Erie and the small lakes of northern Ohio. "St. Mary's reservoir and Lake Erie," Henshall, 1889; Lorain County, "common in the lake and lower portions of the rivers," McCormick, 1892; Maumee river at Grand Rapids, Waterville and Toledo, St. Mary's river at St. Marys, Tiffin river at Brunersburg, west end of Lake Erie, Kirsch, 1893; Huron river at Milan, Sandusky Bay, Wabash river at Celina, St. Mary's reservoir, R. C. Osburn, 1899; Summit lake and Licking reservoir, R. C. Osburn, 1900. It is very abundant in Sandusky Bay and common in Licking reservoir. I have also seen the species from the Ohio canal at Newark.

Genus: PERCINA.

Percina caprodes (Rafinesque). LOG PERCH; HOGFISH; HOG MOLLY; STONE ROLLER.

Head 4 to 4¾; depth 5 to 6½; eye 4. D. about XV–15; A. II, 11, Body elongate, slender. Head long and pointed, depressed and sloping above; snout "pig-like," projecting beyond the inferior mouth; eyes widely separated. Color, light yellowish or yellowish green, with about 15 vertical, dark bars extending down on sides below lateral line and alternate with the same number of shorter bars. Length 8 inches.

This largest of Ohio darters is widely distributed over the state and generally common. It is found in the quiet waters of streams of all sizes (but more commonly in the larger ones), and in lakes, on gravelly or sandy bottom. Given by Rafinesque for the Ohio and Miami. Kirtland reported it "common," and Jordan, "generally abundant." Hamilton County, "common in Little Miami river and Ross lake," Henshall, 1888; Lorain County, "not very common, taken both in rivers and the lake, abundant in Sandusky Bay and Put-in-Bay, and it formed the bulk of the fishes that I saw among the terns' nests on Rattle Snake Island," McCormick, 1892; Maumee river system, rather common, nearly all streams, Kirsch, 1893; Franklin County, generally distributed, common, but nowhere abundant, Williamson and Osburn, 1897; Big Jelloway creek, Knox County, "common," Parker, Williamson and Osburn, 1898; Ohio river at Ironton, Huron river at Milan, Ashtabula creek, Wabash river at Celina, Stillwater creek at Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Lake Erie at Sandusky, Cuyahoga river at Kent and Hawkins, Breakneck creek at Kent, Chippewa lake, Summit lake, Grand river at Painesville, Ohio river at Bellaire, Licking reservoir, R. C. Osburn, 1900.

To the northward this species is represented by the following variety:

Percina caprodes zebra (Agassiz). MANITOU DARTER.

This variety is found in the northern part of the state, with the typical *caprodes*. It is known chiefly by the lack of scales on the nuchal region, the rather more slender form, and the shorter vertical bars. It intergrades with the typical *caprodes*.

The Manitou Darter has been recorded for the state by McCormick in Lorain County, 1892, as "occuring with the typical form in proportion of about 1 to 3, some specimens showing intermediate stages;" Lake Erie at Sandusky, Cuyahoga river at Hawkins, and Grand river at Painesville, R. C. Osburn, 1900.

Genus: HADROPTERUS.

Key to Species.

A. Mid-line of belly with a series of enlarged caducous plates, which fall off at certain intervals, leaving a naked strip from breast to vent; preopercle strictly entire, not serrated.
  B. Lower jaw as long as upper, snout very narrow and pointed.—*phoxocephalus.*
  BB. Lower jaw shorter than upper, included; head moderate, not long and pointed.
    C. Cheeks with very small scales; dorsal spines 13 to 15.— *aspro.*
    CC. Cheeks naked; dorsal spines 10 to 12.— *evides.*
AA. Enlarged plates of mid-line of belly persistent at least posteriorly; preopercle finely serrated.— *scierus.*

Hadropterus phoxocephalus (Nelson).

Head 3⅔ to 4; depth 5½ to 6; eye 4½. D. XI or XII–12 to 14; A. II, 8 or 9; scales 12–80 to 85–16; lateral line incomplete. Body slender. Head very long and pointed; mouth terminal, large; jaws sub-equal; snout very long, acuminate. Cheeks, opercles and neck with small scales, breast naked; caducous shields of midline of belly small. Gill membranes somewhat connected. Color, brownish olive, much vermiculated; a row of about 14 dark, quadrate spots, sometimes confluent, along lateral line. Length 6 inches.

Recorded from three widely separated localities, which would indicate a general distribution, yet it seems to be quite rare except in the southwestern part of the state, where Henshall, 1888, reports it as common in Little Miami river. One specimen was taken near Lorain, by McCormick, 1892; and Mr. E. B. Williamson and the writer took a single specimen in Big Walnut creek near Lockbourne, Franklin County.

Hadropterus aspro (Cope and Jordan). BLACK-SIDED DARTER.

Head 4; depth 5 to 6; eye 4. D. XIII to XV–11 to 13; A. II, 8 to 10; scales 9–65 to 80–17, lateral line incomplete. Body rather elongate, subterete, compressed behind. Head moderately elongate; snout blunt; mouth sub-inferior, lower jaw included; gill membranes slightly or not at all connected. Opercle with rather large scales; cheek with very small, imbedded scales; breast naked; caducous scales of mid-ventral line rather large. Color light yellowish or greenish yellow, tessellated above with dark olive or blackish; white below; about 8 large, dark blotches along lateral line, these often confluent; fins barred. Length about 4 inches.

A common species throughout the state. Found in clear streams on gravelly bottom. Hamilton County, "common in East Mill creek," Henshall, 1888; Lorain County, "nowhere common, but found in most streams and the lake," McCormick, 1892; Maumee river system, "abundantly distributed in all the

streams examined," Kirsch, 1893; Franklin County, a common darter of general distribution, Williamson and Osburn, 1897; Big Jelloway creek, Knox County, "common," Parker, Williamson and Osburn, 1898; John's creek at Waterloo, Huron river at Milan, Ashtabula creek, Wabash river at Celina, Stillwater creek at Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Ohio river at Bellaire, outlet of Licking reservoir, R. C. Osburn, 1900.

Hadropterus evides (Jordan and Copeland).

Head 4⅓; depth 5⅓; eye 3½, large and high in head. D. XI–10; A. II, 8 or 9; scales 9-52 to 67-9 to 11. Body moderate, somewhat compressed. Head heavy, the profile rather convex. Mouth moderate, lower jaw included. Cheeks, nape and throat naked; opercles with rather large caducous scales; ventral shields but little enlarged. Fins large, pectorals long. Coloration extremely brilliant in breeding males, females and young plainer. General color above, dark olivaceous, tessellated with darker; back and sides with about 7 broad, transverse bars; fins marked with orange, black, bronze, yellow and blue-black. "One of the most brilliant of all fishes." Length 2 or 3 inches.

Rare in Ohio, its distribution being more westerly. The species has, however, been taken in the Ohio river at Raccoon Island, by Dr. Henshall, 1889, and by Kirsch, in the Maumee river at Grand Rapids.

Hadropterus scierus Swain.

Head 4 to 4⅘; depth 5 to 6; eye 4 to 4½. D. XIII–13 or 14; A. II, 9; scales 7–68 to 70-17. Body robust. Head rather short, snout bluntish; mouth small, lower jaw included; preopercle more or less distinctly serrate. Gill membranes broadly connected. Opercle with large scales, those on cheek slightly smaller. Throat naked, breast nearly so. Ventral shields but little enlarged and not caducous except anteriorly. Color yellowish olive, everywhere vaguely blotched with black; top of head, dorsal, anal and ventral fins black in male, paler in female; scales everywhere finely punctulate with brown; sides with a few larger, black specks. Length 5 inches.

Rare. Like the preceding species, its distribution is westerly. I know of but one record for the state, that by Henshall, "Ohio river, near Little Sandy river, 1889."

HADROPTERUS PELTATUS (Stauffer).

Mr. McCormick has recorded (1892) this species from Vermillion river, two specimens. *H. peltatus*, as now understood, occurs from southeastern Pennsylvania southward along the coast, and is not known west of the Alleghanies, so I am inclined to think there must be some error in the above record. Under this belief I omit the species from the Ohio list.

Genus: COTTOGASTER.

Key to Species.

A. Mid-line of belly with a series of enlarged caducous scales or plates.— *copelandi.*
AA. Mid-line of belly naked anteriorly, covered with ordinary scales posteriorly.— *shumardi.*

Cottogaster copelandi (Jordan).

Head 3¾ to 4¼; depth 5½ to 6½; eye about 3½. D. X to XII–10 to 12; A. II, 8 or 9; scales 6-44 to 56–8. Body rather slender. Head rather large and long, much resembling that of *Boleosoma*. Mouth small, horizontal, sub-inferior, cheeks naked; opercles and neck with a few scales, throat naked; ventral plates well developed. Pectoral fin as long as head. Color, brownish olive, tessellated above; a series of small, oblong, dark blotches along lateral line, sometimes indistinct. Vertical fins with dusky specks; a black spot on anterior rays of spinous dorsal. Length 2½ or 3 inches.

Widely distributed over the state, but apparently very rare everywhere. Muskingum river, and Ohio river at Raccoon Island, 1889, and Lake Erie at Put-in-Bay, Henshall; Lorain County, "Vermillion river, but one specimen taken," McCormick, 1892; Maumee river at Toledo, two specimens, Kirsch, 1893; in Huron river at Milan, in 1897, two specimens were taken by Prof. D. S. Kellicott, Mr. E. B. Williamson and the writer.

Cottogaster shumardi (Girard).

Head 3⅝ to 4; depth 5 to 5½; eye 3½. D. IX to XI–13 to 15; A. II, 10 to 12; scales 6–48 to 60–11. Body stout, heavy forward, compressed behind. Head broad and thick. Mouth large and broad, lower jaw the shorter. Premaxillaries usually protractile, but a narrow frenum sometimes present. Cheeks, opercles and neck usually scaly; chest naked; belly naked anteriorly, scaled for a short distance before vent. Color dark, densely but vaguely spotted with darker; sides with 8 or 10 obscure blotches; a large, black spot at base of spinous dorsal behind, and a small one in front. Length 3 inches.

Not common, but occuring in both the Lake Erie and Ohio river drainage. Found on sandy bottom in rivers, not found in small streams. Recorded by Henshall for the Muskingum river and for the Ohio river near Parkersburg, 1889; recorded for Vermillion river as *Etheostoma wrighti*, by McCormick, 1892; in 1899 the writer took a half dozen specimens in the Ohio river at Ironton, and in August, 1900, the species was again taken at Bellaire.

Genus: DIPLESION.

Diplesion blennioides (Rafinesque). GREEN-SIDED DARTER.

Head about 4½; depth 4¾ to 6. D. XII to XIV-12 to 15; A. II, 8 or 9; scales 6–58 to 78–14. Body elongate, subterete. Head short, profile very convex, snout very blunt, cheeks tumid; eyes large, 3½, high up and close together; mouth small, inferior; gill membranes broadly connected. Cheeks with fine scales, opercles with large ones, breast naked Color dark olive green, tessellated above; sides with 7 or 8 Y-shaped, dark bars, these sometimes confluent to form a dark zigzag band. In highly colored males a number of broad, bright green bands almost encircle the body. Females and young may be quite dull, but the pattern of the dark marks on the side is characteristic. Length 3 to 5 inches.

The Green-sided Darter is an abundant resident of the clear, rapid streams of the state, found especially on stony ripples. Rafinesque records it from the Ohio and Muskingum. Kirtland mentions its occurrence in the state, and Jordan gives it as "abundant." Hamilton County, "abundant in East Mill creek and Little Miami river," Henshall, 1888; "Vermillion river, scarce, not uncommon in Sandusky Bay," McCormick, 1892; Maumee river system, taken in all the large streams (except St. Mary's river) and nearly all the smaller ones, Kirsch, 1893; Franklin County, abundant, and of general distribution, Williamson and Osburn, 1897; Big Jelloway creek system, common on ripples, Parker, Williamson and Osburn, 1898; John's creek at Waterloo, Huron river at Milan, Ashtabula creek, Wabash river at Celina, Stillwater creek at Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Mahoning river, E. B. Williamson, 1900; Cuyahoga river at Hawkins, Breakneck creek at Kent, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon creek at Bellaire, R. C. Osburn, 1900.

Genus: BOLEOSOMA.

Boleosoma nigrum (Rafinesque). JOHNNY DARTER.

Head about 4; depth 5 to 6; eye 3½ to 4. D. IX–11 to 14; A. I, 7 to 9; scales 5–44 to 55–9. Body fusiform, slender. Head moderate, snout somewhat bluntly decurved; mouth small, lower jaw included. Cheeks and breast usually naked; opercles scaly. Anal spine short and weak; fins all high.

Color usually pale olivaceous, much tessellated above; sides with numerous small W-shaped, dark blotches. Males in breeding season heavily pigmented, especially anteriorly, with blue-black. A black line forward and downward from eye. Fins barred. Length 2 to 2½ inches.

The little Johnny Darter is found all over Ohio, and is usually quite abundant. It inhabits lakes and rivers on sandy bottom, the clear creeks of Ohio are favorite abiding places, and every small brook and spring run large enough to contain any fish at all will be found to have its quota of "Johnnies." Hamilton County, "common in Little Miami river," Henshall, 1888; Lorain County, "very common everywhere, one of the few species that may be depended upon when the seine is drawn," McCormick, 1892; Maumee river system, common everywhere, Kirsch, 1893; Franklin County, taken in every stream, abundant, April 3rd given as a breeding date, Williamson and Osburn, 1897; Big Jelloway creek system, abundant in every stream, Parker, Williamson and Osburn, 1898; John's creek at Waterloo, Huron river at Milan, Sandusky Bay, Ashtabula creek, Wabash river at Celina, Stillwater and Wolf creeks at Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Niggermill Run and Mahoning river, E. B. Williamson, 1900; Pippin lake, Chippewa lake, Summit lake, Cuyahoga river at Kent and Hawkins, Breakneck creek at Kent, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, Ohio river and McMahon creek at Bellaire, Licking reservoir, R. C. Osburn, 1900.

Genus: CRYSTALLARIA.

Crystallaria asprella (Jordan).

Head 4⅛ to 4½; depth 7 to 8. D. XII to XIV–13 to 15; A. I, 12 to 14; scales 7 to 10-98 to 100–10. Body long and slender. Head long and slender; eye large; mouth not large, subterminal; premaxillaries not protractile; opercular spine well developed. Cheeks and opercles with pectinate scales; throat and belly naked, space between ventrals scaled. Color translucent olive, pellucid in life; with 3 or 4 more or less distinct, dark cross bands on back and sides; a dark lateral band made up of about 10 more or less confluent blotches. Length 5 or 6 inches.

Apparently a very rare species in Ohio, and confined to larger streams. Recorded by Henshall for the Muskingum river, 1889; and one specimen was taken on sandy bottom in the Ohio river at Ironton, May 31, 1899, by the writer.

Genus: AMMOCRYPTA.

Ammocrypta pellucida (Baird). SAND DARTER.

Head 4 to 4¾; depth 7 to 8½. D. X–10; A. I, 8 to 10; scales in lateral line about 75, about 6 rows above lateral line. Body very long, terete, quite pellucid in life. Head stout; eyes large, high up, interorbital space narrow. Cheeks, opercles, and temporal region with embedded scales; belly and sides below lateral line entirely naked; much of dorsum in front and on either side of dorsal fin naked or thinly scaled. Translucent, sometimes tinged with olivaceous; scales with narrow, dark edging; about 12 or 15 black blotches along the sides; a gilt lateral band. Length 3 inches.

The Sand Darter is well distributed over the state and is common locally in larger streams on sandy bottoms. Taken also in the lake. Hamilton County, common in Little Miami river, Henshall, 1888; Lorain County, Lake Erie and the larger streams, not common, McCormick, 1892; "common everywhere on sandy bottom in the Maumee river, and in the lower courses of the larger tributaries," Kirsch, 1893; Franklin County, Olentangy river, Big Walnut and Little Walnut, Big Darby and Black Lick creeks, not common, June 28 given as a breeding date, Williamson and Osburn, 1897; Huron river at Milan, Wabash river at Celina, Stillwater creek near Dayton, R. C. Osburn, 1899; Grand river at Painesville, Ohio river at Bellaire, R. C. Osburn, 1900.

Genus: ETHEOSTOMA.

Key to Species.

A. Lateral line complete. (A few tubes rarely wanting.)
  B. Gill membranes broadly connected across the isthmus.
    C. Anal fin nearly as large as soft dorsal; spinous dorsal with about 13 spines.— *variatum.*
    CC. Anal fin much smaller than soft dorsal; spinous dorsal with 10 or 11 spines — *zonale.*
  BB. Gill membranes scarcely connected across the isthmus.
    D. Head short, the muzzle abruptly decurved, mouth somewhat inferior, lower jaw included.— *camurum.*
    DD. Head rather long and pointed, snout not decurved, mouth terminal, jaws subequal.— *maculatum.*
AA. Lateral line more or less incomplete.
  E. Humeral region without differentiated black, scale-like process.—*coeruleum.*
  EE. Humeral region with distinct, black process or scale.
    F. Gill membranes scarcely connected; lower jaw not projecting.— *tippecanoe.*
    FF. Gill membranes connected; lower jaw strongly projecting.—*flabellare.*

Etheostoma variatum Kirtland.

Head 3½ to 4 or more; depth 4⅘ to 5½; eye 3½ to 4. D. XII–13 (XII to XIV–11 to 13); A. II, 7 to 10; scales 8–51 to 63–12. Body moderately elongate, not much compressed, the back somewhat arched. Head short and thick; snout short and blunt, decurved, parietal region broad and depressed, resembling *Hadropterus* in this respect; profile above eyes strongly decurved; mouth small, lips thick, lower jaw included; premaxillary not protractile; gill membranes united. Head naked except 1 to 3 scales on opercle above; breast loosely scaled. Fins all very large, pectorals reaching beyond tips of ventrals. General color above, dark greenish olive, becoming barred vertically on the sides posteriorly, about four black blotches across the back. Females and young similarly marked, but paler. The following color description taken from the living specimen is typical of breeding males: Color, dark olive, with about 8 greenish cross-bars on posterior part of body; interspaces pale, each with 2 bright carmine spots; back crossed by 4 black bars; sides of belly bright orange; middle of belly pale; first dorsal dark brown at base, then a pale space, above this a wide, dark bar, then another pale space, bordered with bright orange; second dorsal and caudal flecked with carmine; anal greenish, bordered with pale orange; ventrals greenish black with a little orange at the margin; pectorals tinged with orange and green, the rays with carmine spots. Length 3½ inches.

This elegant darter was described by Dr. Kirtland from the Mahoning river in 1838, and was not taken again in the state for fifty years, until, in 1888, Henshall recorded it for the Little

Miami river, near Red Bank, as "not rare." In April, 1897, Mr. J. B. Parker found it common on swift ripples in Big Jelloway creek, Knox County, and in May, 1898, Messrs. Parker, Williamson and the writer, seining the Big Jelloway creek system, found this to be "the most abundant darter, especially frequenting swift ripples." In Franklin County, in the summer of 1897, the species was taken by Mr. E. B. Williamson and the writer on swift ripples in Big Walnut creek, Little Walnut creek, and Black Lick, but nowhere common. In 1899 the writer took the species in North Fork of Licking river near Newark ; and in 1900, in the Ohio river at Bellaire.

Etheostoma zonale (Cope).

Head 4 to 5; depth 4 to 6; eye 3½ to 4. D. X or XI–10 to 12; A. II, 6 to 8; scales about 6–5c–9. Body rather slender, somewhat compressed. Head small and short; mouth small, subinferior; snout blunt, profile rapidly descending; gill membranes broadly connected. Cheeks, opercles and neck usually scaled, breast usually naked. Color clear olive green above, with 8 or 10 greenish blue vertical bands which encircle the body posteriorly; below paler, with a brassy tinge; breast greenish black. First dorsal black at base, then a wide orange bar margined with black anteriorly, with greenish posteriorly; second dorsal orange at base, dark above; caudal and pectorals plain, tinged with green; anal and ventrals green, black at base. Young and females dull and speckled, the vertical bars indistinct and the fins speckled. Length 2 or 3 inches.

This species has been taken in a number of localities of the state, indicating a pretty general distribution. It is locally common, but is only taken on swift ripples. Hamilton County, "common in East Mill creek and Little Miami river," Henshall, 1888 ; Franklin County, Scioto river, Olentangy river, Big Walnut creek, Little Walnut creek, Alum creek, Black Lick, common where found, Williamson and Osburn, 1897 ; Big Jelloway creek system, Knox County, "common on swift ripples," Parker, Williamson and Osburn, 1898 ; Huron river at Milan, Stillwater and Wolf creeks near Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899 ; Ohio river at Bellaire, R. C. Osburn, 1900.

Etheostoma camurum (Cope). BLUE-BREASTED DARTER.

Head 3½ to 4; depth 4 to 4½. D. XI–12 or 13; A. II, 8; scales 7–50 to 58–8. Body stout, rather compressed. Head short; snout blunt, profile

rapidly descending; lips thick, lower jaw included. Caudal peduncle deep. Color, dark olivaceous, sometimes nearly black above, somewhat barred on the sides; a dark longitudinal line on each row of scales; sides irregularly flecked with crimson dots; belly pale; throat and breast deep dark blue. Fins marked with brown, green, black, yellow and crimson. Females less distinctly marked. Length 2½ inches.

The Blue-breasted Darter is rather rare in Ohio, although it has been taken at a number of widely separated localities, which would indicate a general distribution. It is found in company with *E. zonale*, on swift, stony ripples, but is much less frequent in occurrence. Jordan mentions it for the Mahoning river; "Muskingum river," Henshall, 1889; Franklin County, Scioto river, Olentangy river, Big Walnut creek, not common, Williamson and Osburn, 1898; Huron river at Milan, Stillwater creek at Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899.

Etheostoma maculatum Kirtland.

Head 3¾ to 4; depth 4⅔ to 5¼. D. XII–12 or 13; A. II, 8 or 9; scales 9–56 to 63–14. Body elongate, caudal peduncle very deep. Head acuminate, the front descending very gradually, the mandible rising as gradually to its extremity; jaws subequal. Lateral line complete; cheeks naked; opercles scaled; gill membranes not connected. Color, above black, shading to dark olive below; throat turquoise blue; sides and dorsum marked with small, circular spots of bright crimson. First dorsal uncolored, with a black spot at its base in front and a dark shade through the middle; second dorsal blood red; caudal with two large, crimson spots confluent on the mid-line of the tail at its base. Female dull, the fins dark barred and not crimson. Length 2½ inches.

Very rare. The species was described in 1838 from specimens taken in the Mahoning river by Dr. Kirtland. I know of but one subsequent record of its capture within the state. Mr. E. B. Williamson and the writer took a single specimen, a female with ripe eggs, from a swift ripple in Big Walnut creek, near Lockbourne, Franklin County, on June 26, 1897.

Etheostoma cœruleum Storer. RAINBOW DARTER; BLUE DARTER; SOLDIER FISH.

Head 3½ or more; depth 4¼; eye 4 to 4½. D. IX to XII–12 to 14; A. II, 7 or 8; scales 5–37 to 50–10. Body robust, rather deep and compressed. Head large, compressed. Mouth moderate, terminal, oblique, the lower jaw somewhat included; gill membranes not united. Cheeks naked

or nearly so, opercles scaled, neck and breast usually naked. Color, olivaceous, tessellated above; sides with a varying number (about 12) of vertical, indigo-blue bars, separated by orange interspaces; throat, breast and sides of belly orange; cheeks blue-green; first dorsal crimson at base, above this an orange bar, margined with blue; other vertical fins chiefly orange, tipped with blue. Females much plainer, with very little blue or red. Length 2½ inches.

This elegant little fish is widely distributed over the state, and is generally abundant. It is most common in the smaller streams, and is always found in running water, usually on ripples, and does not occur in lakes. Kirtland reported it in 1854 from near Cleveland, under the name *Poecilosoma erythrogastrum*. Jordan gives it as "the most abundant member of the family." Hamilton County, "very common in East Mill creek," Henshall, 1888; Lorain County, "one of the most common darters," McCormick, 1892; Maumee river system, "not taken in the Maumee, St. Mary's and St. Joseph rivers, common in all the other larger streams and nearly all the small ones," Kirsch, 1893; Franklin County, abundant, of general distribution, Williamson and Osburn, 1897; Big Jelloway creek, "very common," Parker, Williamson and Osburn, 1898; John's creek at Ironton, Huron river at Milan, Ashtabula creek, Wabash river at Celina, Stillwater and Wolf creeks at Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Mahoning river, E. B. Williamson, 1900; Cuyahoga river, at Hawkins, Grand river at Painesville, Chagrin river at Willoughby, Wheeling creek at Bridgeport, McMahon creek at Bellaire, R. C. Osburn, 1900.

The following variety of this species is also taken in Ohio:

Etheostoma cœruleum spectabile (Agassiz).

It is known from the typical species by the "faded out" appearance of the ground color of the back, and by the arrangement of the olivaceous into distinct longitudinal lines. It is also rather more slender than the typical *cæruleum*, into which, both in color and in measurement it insensibly grades.

This variety is found in brooks and smaller streams, replacing to some extent the typical form in central and western Ohio. Specimens from Ohio streams show many intermediate stages. Recorded by Kirsch from Sugar creek, near Lima; Franklin County, taken only in the small streams, "grading insensibly into

the typical species," Williamson and Osburn, 1897; headwaters of Wabash river at Celina, Wolf creek near Dayton, brooks tributary to North Fork of Licking river near Newark, R. C. Osburn, 1899; Breakneck creek at Kent, tributaries of Grand river at Painesville, R. C. Osburn, 1900.

Etheostoma tippecanoe Jordan and Evermann.

Head 3½ to 4¼; depth 4¼ to 4¾; eye small, 4½ in head. D. XII–12; A. II, 7; scales 5 or 6–46 to 50–8; lateral line straight, developed on only about 30 scales. Body compressed, caudal peduncle deep. Head rather small, little compressed; mouth large, terminal, oblique, the lower jaw somewhat included; gill membranes scarcely connected. A small, well defined, black humeral scale. Cheeks, throat and breast naked; opercles scaled. Color in life, dark olive green, strongly tinged with yellow, especially posteriorly, passing into greenish yellow on belly; about 14 narrow, well defined, greenish black vertical bands encircling the body posteriorly; breast deep blue-black, the color extending forward on the throat and backward on the ventral fins; dorsal and anal fins golden yellow, pigmented with blue-black; pectorals plain golden yellow; ventrals golden yellow, blue-black at base. Female paler, no high colors, dark markings less distinct. Length 1½ inches.

In Ohio this exceedingly rare darter has been taken only in Franklin County. Four specimens were taken by Mr. E. B. Williamson and the writer, one in the Olentangy river at Columbus, in September, 1896, the other three in Big Walnut creek near Lockbourne, on June 26, 1897. The species was taken in very swift ripples.

Etheostoma flabellare Rafinesque. FAN-TAILED DARTER.

Head 3½ to 4; depth 4½ to 6; eye 4 to 5. D. VIII–12 to 14; A. II, 7 to 9; scales about 9–50–14. Body slender, compressed. Head long and pointed; snout not decurved, mouth very oblique, lower jaw projecting; gill membranes well connected. Fins all low, the first dorsal notably so, and, in the male, the spines tipped with fleshy knobs; caudal large, rounded. Head entirely naked; a narrow, bare strip along base of spinous dorsal. Color very dark olivaceous, forming vertical bars on sides; each scale with a dark center; dark humeral spot conspicuous; dorsal and caudal fins barred with black. Some Ohio specimens approach the variety *lineolatum*, characterized by distinct longitudinal lines along the rows of scales. Length 2½ inches.

A common species in the clear, rapid streams of the state, found especially on ripples. Hamilton County, "common in East Mill creek," Henshall, 1888; Lorain County, "rare,

Vermillion river," McCormick, 1892; Maumee river system, St. Joseph river at Edgerton, Tiffin river at Brunersburg, Sugar creek at Lima, Beaver creek at Grand Rapids, Kirsch, 1893; Franklin County, nearly every stream, abundant, Williamson and Osburn, 1897; Big Jelloway creek, Knox County, "a very common species," Parker, Williamson and Osburn, 1898; John's creek at Waterloo, Huron river at Milan, Ashtabula creek, Wabash river at Celina, Stillwater and Wolf creeks near Dayton, North Fork of Licking river at Newark, R. C. Osburn, 1899; Niggermill Run at Salem, E. B. Williamson, 1900; Lake Pippin, Cuyahoga river at Kent, Wheeling creek at Bridgeport, Ohio river and McMahon creek at Bellaire, R. C. Osburn, 1900.

Genus: BOLEICHTHYS.

Boleichthys fusiformis (Girard).

Head 3½ to 4; depth 3¾ to 6; eye 3 to 4. D. VIII to X–9 to 12; A. II, 6 to 8; scales 3-43 to 60–12. Body usually elongate, compressed. Head rather long and narrow; snout short, decurved; mouth terminal, lower jaw slightly included; premaxillaries not protractile; gill membranes connected. Cheeks, opercles, nape and breast usually scaled. Lateral line incomplete, high up, often interrupted. Color, olivaceous, the sides and back blotched with darker, pale below; in adult males the sides are usually flecked with crimson; base of caudal with 4 dark spots in a vertical row; spinous dorsal usually blue, with a median crimson band. An extremely variable species.

Jordan records the species for the state as "noticed only in tributaries of the Maumee, in Ohio." No other collector mentions it. However, it seems to be distributed over northern and central Ohio, in suitable localities. The writer has found it to be rather common in shallow water in Sandusky Bay, and has taken it also in the Huron river at Milan, 1899, and in Pippin and Summit lakes and in Licking reservoir, 1900.

Family: SERRANIDÆ.

Genus: ROCCUS.

Roccus chrysops (Rafinesque). WHITE BASS.

Head 3½; depth 2½; eye 5. D. IX–I, 14; A. III, 11 or 12; scales 10-55 to 65–15. Body rather deep and compressed; back considerably arched. Head subconical; mouth moderate, nearly horizontal, lower jaw slightly projecting. Head scaled to between nostrils. Color, silvery, tinged with golden below; sides with narrow, dusky lines. Length 15 inches.

An abundant species in Lake Erie, ascending the larger tributaries to some distance. The species is said to be common in the lower Ohio, but no one seems to have noticed it within the limits of the state, though it probably ascends to that distance. Lake Erie, Henshall, 1889; Lorain County, "quite common in the lake, ascending the streams to the dams," McCormick, 1892; Maumee river at Grand Rapids, Waterville and Toledo, Kirsch, 1893; abundant in Lake Erie at Sandusky, rare in Huron river at Milan, R. C. Osburn, 1899.

Family: SCIÆNIDÆ.

Genus: APLODINOTUS.

Aplodinotus grunniens Rafinesque. SHEEPSHEAD; DRUM; WHITE PERCH.

Head 3⅓; depth 2¾; eye 3. D. X, 30; A. II, 7. scales 9-55-13. Body oblong; back much elevated and compressed; profile long and steep, straightish. Head slightly compressed; mouth moderate, subinferior. Lower pharyngeal bones fully united, with course, blunt, paved teeth. Color, grayish silvery, dusky above, sometimes very dark; back sometimes with dusky streaks along the rows of scales. Attaining a weight of 50 or 60 pounds.

An abundant species both in Lake Erie and the Ohio river, and ascending their larger tributaries to some distance. Kirtland, following Le Sueur, recorded the lake form as *Sciæna oscula*, and the Ohio river form as *S. grisea*. Jordan gives it as very abundant in Lake Erie, and also mentions it for the Ohio. Hamilton County, "abundant in Ohio river," Henshall, 1888; Lorain County, "very common in the lake, Vermillion river, Black river," McCormick, 1892; Maumee river at Defiance, Grand Rapids, Waterville and Toledo, west end of Lake Erie, Kirsch, 1893; Muskingum river at McConnellsville, Prof. D. S. Kellicott; Ohio river at Ironton, Huron river at Milan, Lake Erie at Sandusky, R. C. Osburn, 1899; Ohio river at Bellaire, R. C. Osburn, 1900.

Family: COTTIDÆ.

Genus: COTTUS.

Cottus ictalops (Rafinesque). MILLER'S THUMB; SPRING FISH.

Head about 3⅓; depth 4 to 6; eye 4. D. VI to VIII–16 or 17; A. about 12; ventral fin I, 4, the spine slender and closely attached to the first ray. Body stout anteriorly, tapering regularly back to the slender caudal peduncle. Skin smooth, except just behind the pectorals, where it is beset with very small, sharp prickles, these sometimes obsolete; lateral line conspicuous. Gill membranes not meeting across the very broad isthmus. Olivaceous, more or less barred and speckled with darker; fins mostly barred or mottled. Quite variable. Males in breeding season with a wide, black bar margined with orange on dorsal fin, and under side of head pigmented with dark or blue-black. Length 3 to 7 inches.

Widely distributed, but never abundant; sometimes locally common. It occurs in clear, cold brooks and rapid streams. Recorded as *Cottus bairdii*, by Girard, from specimens taken by Spencer F. Baird, in Mahoning river at Poland. Given by Jordan as *C. richardsoni;* Lorain County, common in Spring brook and Chance creek, McCormick, 1892; Maumee river system, St. Joseph river at Edgerton, Kirsch, 1893; Franklin County, four specimens from Brackenridge's Run, Williamson and Osburn, 1897; Big Jelloway creek system, Knox County, Parker's Run and Black's Run, common in the latter, Parker, Williamson and Osburn, 1898; a small brook tributary to North Fork of Licking river at Newark, R. C. Osburn, 1899.

Family: GADIDÆ.

Genus: LOTA.

Lota maculosa (Le Sueur). BURBOT; LING; LAKE LAWYER.

Head 4½; depth 5½; eye 7. D. 13–76; A. 68; scales very small, embedded. Body elongate, not much compressed anteriorly. Head slightly depressed; mouth large; a single barbel on the chin. 30 pyloric coeca. Color, dark olive, thickly marbled and reticulated with blackish; below, yellowish or dusky. Length about 2 feet.

Common in Lake Erie, not recorded elsewhere in the state. Recorded for Lake Erie by Le Sueur, 1817, by Kirtland, 1838; by Henshall, 1888, and by McCormick for Lorain County, Lake Erie, 1892; Sandusky, R. C. Osburn, 1899 and 1900.

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A Review of the Tettigonidae of North America, North of Mexico

BY

ELMER D. BALL, M. Sc.

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A REVIEW OF THE TETTIGONIDAÆ OF NORTH AMERICA NORTH OF MEXICO.

BY E. D. BALL.

The present paper has been planned to serve a double purpose. Its first object being to furnish a means of separating and determining the members of this family found in the United States and Canada, together with their varieties and the synonomy as far as it has been worked out. Secondly, to give sufficiently accurate and detailed descriptions in all cases, even where not necessary in the separation of our own forms, so that later workers in the group and those from other parts will be able to discriminate between our species and closely allied forms from other regions, or to recognize our forms when found in other countries.

This is all the more necessary from the fact that this group, which forms a very small part of the Jassid fauna in the United States, becomes the dominant one in tropical regions, especially of the Western Continent. Of the five hundred or more described species the great majority are found in the region between Mexico and Brazil. A number of these species, among which are some of our own forms, extend throughout the whole of this territory.

Taking into account these facts and the addditional one that most of the work on the group so far has been done by European authors, whose material was mainly from tropical regions, and who paid little attention to the isolated descriptions of the American authors, it is little wonder that there is much of synonomy. At the same time American authors have paid little attention to the European work, and a goodly number of the later synonyms are from this side of the water. Mr. Walker, of course, con-

tributed to the confusion. There is much in synonomy yet to be worked out which can only be completed when the species of the different countries have been carefully collected and accurately determined as to specific and varietal limits.

The bibliography of our forms in this group has been so carefully and accurately worked out by Van Duzee in his Catalogue of the Jassoidea that it seemed unnecessary to repeat it here. Under each species is given the reference to the original description and the date, and reference to the descriptions of all synonyms and varieties. In addition to this, references are given to systematic works published since the Van Duzee Catalogue, and references that have been changed from that given in the catalogue, are included, when necessary to make them clear.

There are few characters that seem available for generic use, and consequently, the classification within certain parts of the group is very unsatisfactory. With a limited number of species, such as we possess, one may readily lay down characters that will separate them into well-defined genera, but with a large number the task becomes more difficult.

The author has followed Stal in generic disposition, the main objection to this system being that the genus *Tettigonia* is still burdened with an immense number of quite diverse species. Even in our fauna it contains quite widely separated forms. It will, however, be necessary to study carefully a representative series from tropical regions before any rational and permanent separation can be had. On the other hand, the group represented by *mollipes* is mainly temperate in distribution, we having seven species in our fauna, of which Fowler only records two for Mexico and Central America, and it has been thought best to separate it from *Diedrocephala*.

The adoption of a system of describing by means of varieties, in some cases, was but the choice of evils, it seeming to be almost impossible to define some of the variable forms in any other way. Having adopted that method, it seems preferable to designate them by names rather than

by symbols or letters, as is often done, especially as in the majority of cases these varieties have already received names.

In the prosecution of this work, I have had for study the collection of the Iowa State College and the Van Duzee collection, both very rich in material, through the kindness of Prof. H. E. Summers; the National Museum collection, through the kindness of Dr. L. O. Howard; the Ohio State University collection and the private collection of Prof. Herbert Osborn; a series of Florida forms from Prof. H. A. Gossard; and a fine series of Eastern forms from Mr. Otto Heidemann; the Colorado Agricultural College collection; some typical specimens of Woodworth's species, from the Illinois Laboratory, through Prof. Hart; and numerous smaller series sent in for determination. My own collection includes all but one of the forms enumerated in the paper, as well as a large number of species from Mexico, the West Indies and South America, some two hundred species in all.

This large amount of material has made it possible to more thoroughly investigate and define the ordinary variations of a species and to recognize some hitherto very puzzling forms as only extreme variations in a specific type. Some of these variations were found to run through a considerable number of species, disrtibuted through several genera, often the same variation would be found to occur in a majority of the species of a given locality.

The most striking structural variation commonly met with was the broadening of the head and consequent relative shortening of the vertex noticed in the specimens from the Pacific Coast and Mexican points. This was particularly noticeable in the Western specimens of *T. hieroglyphica* var. *confluens* and in the Mexican specimens, *tripunctata* and *bifida*; specimens of *bifida* from the West Indies were intermediate in this character. Another common variation was the change in the ground color in pronotum and elytra from red to blue and even green, with all possible combinations and variations in these colors. The variations in *T. hieroglyphica* and *O. undata* are striking exam-

ples of this, and it is also found in *T. gothica*, *occatoria*, *dohrni*, *bifida* and *tripunctata*. The darkening up of species in their northern limits is also intensified in this group, and, as usual in the Jassoidea, specimens from the Pacific Coast, especially in the northern part, are considerably larger than those from the Mississippi Valley and farther east. Those from the Rocky Mountains and the adjacent plains are somewhat intermediate, grading off on either hand.

The gentalia are of less importance in this group, as a whole, than in many others, but, as in some species, they are strikingly distinctive and in most cases they furnish good characters in one or both sexes they have been made rather prominent, in striking contrast to the treatment of other authors. The venation of the elyta has been found to be of considerable service in defining groups of species, and in some instances furnishing specific characters.

The Tettigonidae are at once separated from the rest of the Jassoidea by the ocelli being situated on the disc of the vertex. They are usually divided into two groups, on the general shape of the body, as follows:

General form, cylindrical, usually elongate.....Tettigoniina
General form, broadly oval, or flattish, usually compact..Gyponnia

The present paper deals only with the first group, excluding some forms like *Euacanthus* and its allies, which are usually placed here.

SUB-FAMILY TETTIGONIINA.

The following key to the genera while emphasizing the fundamental characters separating the genera, as a whole, makes use of other and minor characters that are of value in separating our forms, but that might be untenable in a larger series:

KEY TO THE GENERA.

A. Antennal sockets usually overhung by a distinct ledge, the anterior extremity of which is deflexed and roundingly truncate. Anterior tibiæ sulcate above or dilated at the extremity. Elytra narrow, not covering lateral margin of abdominal tergum. Head and pronotum usually deflexed.

B. Thorax roundingly six-angular, posterior margin rounding, with a slight medianexcavation. Vertex longitudinally furrowed. Claval veins distant.....*Aulacizes.*

BB. Thorax 4-angular, posterior margin broadly, roundingly emarginate, the anterior and posterior margins nearly parallel. Claval veins often united in the middle or approaching and tied by a cross nervure.

C. Vertex long, triangular, longer than width between eyes side margins nearly straight, face as seen from side nearly straight.....*Homalodisca.*

CC. Vertex obtusely rounding, shorter or only equal to width between eyes, face as seen from side roundingly angled .....*Oncometopia.*

AA. Ledge above antennal sockets small, the anterior extremity as seen from above not projecting, included in the curve of the head, Anterior tibiae slender round or triangular, Elytra broad, covering the abdominal tergum. Head and pronotum rarely sloping.

B. Elytra not reticulate veined at the apex, at most with five apical and three anteapical cells. Head not greatly produced.

C. Vertex with the margin rounding obtuse, the front inflated.

D. Antennae setaceous, pronotum not twice as long as scutellum the posterior margin long not strongly emarginate ..*Tettigonia.*

DD. Antennae in the male enlarged at the apex. Pronotum less than twice as long as the scutellum, posterior margin short deeply emarginate.....*Helochara.*

CC. Vertex flat, the margin sharp or line-marked, distinct, vertex and front forming an acute angle, front broadly transversely convex, not inflated... .....*Diedrocephala.*

BB. Elytra reticulate veined from the apex as far back as the forking of the outer branch of the first sector. Head often produced into a triangle, longer than pronotum.. .....*Draeculacephala.*

GENUS AULACIZES AM. AND SERV.

Head slightly inclined, vertex moderately long, bluntly rounding disc, nearly flat longitudinally, furrowed front gibbous, clypeus as seen from side obtusely angled, a distinct ledge over antennal sockets, pronotum inclined anteriorly long, 6-angular widest at the lateral angles, rounding behind with a slight median emargination as in Tettigonia, anterior tibiæ furrowed on upper side, elytra not concealing lateral margin of abdomen.

But one species of this genus has been found in the United States.

Aulacizes irrorata Fab. Plate 1 Fig. 1.

Cicada irrorata, Fab. Ent. Syst. IV., p. 33, 1794.
Cicada nigripennis, Fab. Ent. Cyst. IV., p. 32, 1794.
Aulacizes rufiventris, Walk. Homop. III., p. 796, 1851.
Aulacizes guttata, Uhl. Stan. Nat. His.; Van D. Cat. (Nec. Sign.)
Aulacizes pollinosa, Fowl., Bio. Homop. II., p. 218.; pl. 15, fig. 18

Long cylindrical, testaceous, brown, finely irrorate with pale yellow. Length, 12.5mm.; width, 3mm.

Head with eyes but little wider than pronotum, triangular the apex rounded. Vertex slightly shorter than its basal width, disc sloping, on same plane as pronotum, the surface irregular, a deep median furrow, narrow on posterior half and not quite reaching the margin, broadening out on anterior half until it is bounded by the carinate margin at the apex. Front gibbous, forming a right angle with vertex, clypeus obtusely angled. Pronotum sexangular, rounding in front, the submargin depressed with a few deep pits, disc convex coarsely pitted; humeral margins long, straight, posterior margin rounding with a slight median emargination. Elytra long, parallel margined, opaque not covering the lateral margin of abdomen.

Color; rich leather brown variable in shade, a few irregular blotches on vertex and base of scutellum, a large spot before the apex of the latter, numerous oval spots along the costal margin of elytra and fine irrorations over the pronotum and elytra pale yellow. Vertex and scutellum sometimes suffused with yellowish. Front pale yellow with four black spots in a square above, irregularly black below with a pair of oval yellow spots on clypeus. The yellow band above extends back on sides of thorax to the yellow margin of costa. Abdomen red above, yellowish and fuscous below.

Genitalia; female segment but little larger than penultimate, posterior margin broadly rounding, broadly shallowly notched in the middle; male valve minute, plates concavely triangular apically, convex below, clothed with fine hair, a little longer than ultimate segment.

Specimens are at hand from Pennsylvania, District Columbia, Maryland, South Carolina, Florida, Alabama, Kentucky, Missouri. It occurs from New York to Illinois and Missouri south to Florida and Texas and on into Mexico.

All records for *guttata* within the United States refer to this species. The *guttata* is a very different looking insect scarcely half the size of this species. It belong to the genus *Tettigonia* and has not yet been found north of central Mexico.

VARIETY POLLINOSA FOWL.

Aulacizes pollinosa, Fowl. Bio. Homop. II., p. 218, pl. 13, fig 18, 1899.

Size and structure of typical *irrorata*. Color, orange fulvous, claval areas greenish white, entire upper surface finely irrorate with black.

This is an extreme form of the enlargement of the light spots combined with a change in their color. Specimens are at hand from Florida and Fowler describes it from Mexico.

From Signoret's description there seems to be little doubt but that this is the species that he had in hand and which he said was "common in Brazil." Fowler, however, with "a typical example of Signoret," at hand separated *pollinosa* as distinct from the Brazilian form. If this should prove true, which I doubt, still the name *irrorata* would stand for our form as it was described from Carolina and Walker's rufiventris (which both recognize as a synonym) from Florida.

GENUS ONCOMETOPIA STAL.

Head broader than pronotum; vertex obtuse, rounding, disc convex confused with front, a distinct ledge over antennal sockets; eyes prominent; front gibbous, clypeus scarcely angled. Pronotum short, broadly rounding in front, posterior margin concave, very nearly parallel with the anterior, lateral margins straight, subparallel or slightly narrowed behind. Elytra narrow, margins subparallel, the lateral margins of abdomen exposed. Anterior tibiæ slightly sulcate above.

KEY TO THE SPECIES.

A. Front extending fartherest anteriorly at about the middle, much below the level of vertex and pronotum. Costal area narrow, the cross nervure some distance in front of the fork of first sector. Length 13mm.....*undata* Fab.

AA. Front retreating from a point on a line with vertex and pronotum. Costal area broad, first sector forked before the first cross nervure. Size, small, 9mm or less.....*lateralis* Fab.

ONCOMETOPIA UNDATA FAB., Plate I, Fig. 2.

Cicada undata, Fab. Ent. Syst. IV., p. 32, 1794.
Cicada orbona, Fab. Ent. Syst. Supp., p. 520, 1798.
Proconia nigricans, Walk. Homop. III., p. 783, 1851.
Proconia clarior, Walk. Homop. III., p. 784, 1851.
Proconia lucerne, Walk. Homo. III., p. 785, 1851.
Proconia marginata, Walk. Homop. III., 785, 1851.
Proconia badia, Walk. Homop. III., p. 786, 1851.
Proconia scutellata, Walk. Homop. III., 786, 1851.
Preconia tenebrosa, Walk. Homop. III., p. 787, 1851.
Proconia plagiata, Walk. Homop. III., p. 788, 1851.
Oncometopia undata, Fowl. Bio. Homop. II., p. 231, pl. xiv, figs. 19 and 20.
Oncometopia alpha, Fowl. Bio. Homop. II., p. 232, pl. xiv, fig. 22.

Resembling *A. irrorata* in size and form, but with a much wider head and more prominent eyes. Head and scutellum yellow with black markings. Pronotum and elytra slaty or reddish with blue mottlings. Length, 13mm; width, 3mm.

Head and anterior part of pronotum inclined in same plane. Head broad, eyes prominent. Vertex two-thirds as long as its basal width, roundingly right angled, the apex blunt. Front gibbous, as seen from side rounding, the apex below the middle. Pronotum convex, elevated, one-half wider than long. Elytra long, narrow, claval veins but slightly approaching each other usually with a cross nervure, costal area norrow, scarcely wider than adjacent discal cell, the cross nervure between the sectors some distance before the fork or the first sector.

Color; vertex anterior margin of pronotum and the scutellum rusty orange, an incomplete circle before the middle of the vertex, open in front giving off eight radiating lines, two running back and curving around the ocelli, two running forward and meeting at the apex, the other two pairs equidistant between these, a line along the margin from the eye to the apex, some irregular markings at the base and on anterior margin of pronotum, black. Scutellum with a transverse oval giving off six lines, two to each margin. Pronotum and elytra varying from slaty blue to brown and bright red, sometimes a large pruinose patch on either side just back of the middle of the elytra. Front orange, a black line on middle and a pair of latteral, converging lines which sometimes meet below the apex. Below dirty yellow, abdomen black above, margins yellow.

Genitalia; female segment a little larger than penultimate, the posterior margin divided into three nearly equal rounding lobes, the median one horizontal, the two lateral ones sloping or curved around ovipositor. The horizontal disc parabolic, with a median and often lateral carinæ; male plates about half as wide as the ultimate segment, together equilaterally triangular or slighly elongate.

Specimens are at hand from District of Columbia, Maryland, Virginia, Georgia, North Carolina, Florida, Alabama, Louisiana, Missouri, Texas and Mexico, Central America, Dutch Guiana and Brazil.

It occurs in our territory from New Jersey, Maryland, Michigan, Illinois and Missouri, through the Southern States to Florida and Texas, and on south to Brazil.

The synonomy of this species is very puzzling, and that given above does not represent in full the conclusion reached by the author, but only that part of it that appears to be unquestionable or that comes in our range. After examining a series from South America and compar-

ing them with Central American and Mexican forms it seems nearly certain that *obtusa* Fab. was but a dark variety of *undata*, and as *obtusa* was described first the species would bear that name, while our forms would be the variety. Stal in Hemip, Fabriciana describes *obtusa* as with the head markings of *undata;* these markings are very constant and can be partially traced, except in the darkest forms, and appear to be one of the best distinguishing characters outside of the genitalia. Signoret does not mention these markings nor figure them in *obtusa*, but he places *clarior* Walker from Fla as a synonym, and it had the head markings distinct, as described by Walker. He gives the claval veins as united in *obtusa*, but Stal gives them as like *undata*. Signoret does not describe genitalia under *obtusa*, but under his next species he describes it in showing how that species differs from it. Fowler follows Signoret in his treatment of the species, and under remarks on *tartarea* describes the genitalia of *obtusa* as like that of our *undata*. He follows Signoret in the synonomy of *undata* and adds *marginata* and its three synonyms; he, however, places *undata* on a very pale form, which he figures, and then describes *alpha* as a possible variety, while in fact it is nearer the typical form, His next species, *rubescens*, and a previous one, *interjecta*, seem also to belong to the *obtusa* group. He suggests *tartarea* and *funebris* as coming in there, but specimens in hand from Mexico which agree with the descriptions of these species are quite distinct. The *funebris* is given as from Calif. by Signoret, but no specimens of it have been seen from there, and it has not been included in the synopsis; possibly Lower Calif., Mexican, is meant.

If, on further examination, the above conclusions prove to be correct, then the full synonmy of *obtusa*, as far as known, will be, in addition to the above, all of which will come under the variety *undata*, as follows:

Cicada obtusa, Fab. Mantissa Ins., p. 269, 1787.
Proconia parallela, Walk. Homop. III, p. 788, 1851.
Tettigonia facialis, Sign Monog. An. Sc. Ent Fr., p. 489, 1854.
Tettigonia herpes, Sign. Monog. An. Sc. Ent. Fr., p. 796, 1855.
Oncometopia obtusa, Fowl. Bio. Homop. II, p. 228, 1899.
? *Oncometopia interjecta*, Fowl. Bio. Homop. II, p. 228, 1899, pl 14, fig. 12.
? *Oncometopia rubescens*, Fowl. Bio. Homop. II, p 233, 1899, pl. 14, fig. 24.

Several more of Fowler's species may fall in this list when the Mexican forms are more thoroughly known. His descriptions are very meagre, and he evidently paid little or no attention to genitalia, so that it is very hard to definitely place any of his species until a specimen comes to hand that has the exact color pattern that he described. as he rarely makes any provision for variation in his descriptions.

For the northern part of its range this species seems to be very constantly of the form figured, but farther south the smaller and darker varieties appear, none having been received, however, from nearer than central Mexico. From the extreme southern part of our range (Florida and Texas), a variety that is somewhat shorter and more robust, proportionally, has been received. These specimens are usually very obscurely marked, and of a uniformly dull brown color, but the head pattern and genitalia are identical with the common form.

The color pattern of the head is quite definite in all of the varieties, except the very darkest, where it is obscured, but even here the "A" of the vertex, and the lines of the front can usually be traced in an oblique light, and form one of the best characters for distinguishing this species. Fowler speaks about the color pattern of the pronotum serving to separate this species. This is one of the most variable things about it, and it is little wonder that with such a character as a guide be added to the confusion, instead of helping to clear up the synonomy.

ONCOMETOPIA LATERALIS FAB.

Cicada lateralis, Fab. Ent. Syst. Sup., p. 524, 1798.
Cicada marginella, Fab. Syst. Rhyng., p. 96, 1803.
Cicada costalis, Fab. Syst. Rhyng. Erata following, p. 314, 1803.
Tettigonia striata Walk. Homop. III. p. 775, 1851.
Tettigonia lugens, Walk. Homop. III, p. 775, 1851.
Tettigonia pyrrhotelus, Walk. Homop. III; p. 775, 1851.

Much shorter than *undata* but nearly as broad; eyes not as prominent. Black, coarsely irrorate with yellow; Elytra red, veins black. Length, 7-8 mm.; width, 2.75 mm.

Head and pronotum but slightly inclined, eyes moderately prominent, vertex slightly obtusely angled, twice as long on middle as at eye, length equal to half its basal width, four-fifths the pronotal length. Front moderately gibbous, sloping back from the plane

of the vertex, very roundingly angled below. Elytra broad, and short, the costral area wider than adjacent cells, first sector forking before the cross nervure.

Color; vertex and pronotum black, coarsely and irregularly dotted with yellow; on the pronotum the wrinkles are yellow, the pits black. Scutellum black, broken lines on the margins, a median line on the posterior half, and a pair of lines on anterior disc enclosing a number of yellow spots. Elytra red, with the nervures black; sometimes the disc is slaty blue, with light margins to the nervures. Front black, with round white spots. Below black, sometimes marked with yellow. As seen from side, a narrow yellow line extends around the vertex in front on a level with the eye and runs from the lower corner of the eye to the lateral margin of the abdomen and on back to the pygofers.

Genitalia; female segment twice the length of the preceding, truncate, or very slightly emarginate posteriorly, the lateral angles often depressed, leaving a semicircular disc; male plates, triangular, one-fourth longer than their basal width, as long as the pygofers.

Specimens are at hand from Ontario, District of Columbia, Virginia, Florida, Alabama, Tennessee, Mississippi, Manitoba, Minnesota, Iowa, Dakota, Nebraska, Arkansas, Texas, Montana, Wyoming, Colorado, Idaho, Washington, New Mexico, and Nicaraugua, Central America.

VAR LIMBATA. SAY.

Tettigonia limbata, Say. Jour. Acad. Nat. Sc., Phila., IV, p. 340, 1825.
Tettigonia septentrionalis, Walkr Homop. Supp., p. 193, 1858.

Usually somewhat smaller and narrower than the typical form, often with longer elytra, which gives them a somewhat linear appearance.

Color, shining black, vertex and face usually with a few rather large yellow spots; pronotum with two ocellate orange spots well back of the anterior margin and in line with the ocelli; sometimes another pair on the outer angles of the scutellum Below black, the lateral line extending from the eye back, broad and distinct.

Specimens of this variety are at hand from Colorado, Dakota and Iowa, and it has been reported from Michigan and Canada, and Walker's species was from the Mackenzie river. The white lateral line will at once separate it from the black form of *T. hieroglyphica*, which it somewhat resembles.

The species, as a whole, occurs from the Mackenzie river and Nova Scotia south throughout the whole continent, and to northern South America at least. It is somewhat

local in distribution in some parts. In Colorado it occurs everywhere, but in Iowa it has only been found in a few places along the northern border, and yet it occurs alongside in Missouri and Nebraska. This species is very variable in size and color, the black on vertex and pronotum is fairly constant, while the elytra vary from a bright red to a bright slaty blue and on to shining black, and the irrorations on head and pronotum vary from white to orange, and in some Central American specimens they are rufus. The lateral white stripe, however, remains constant, and will at once distinguish this species.

Fowler, in the Biologia, places this species under *Tettigonia*, along with *punctulata*. This is an error; the resemblance is only superficial. *Lateralis* possesses the angled front, the sulcate anterior tibiæ and the exposed lateral margin to the abdomen, which make it a good *Oncometopia*, and widely separates it from *punctulata*.

GENUS HOMALODISCA, STAL.

Head, large; eyes, prominent, wider than pronotum; vertex and pronotum, inclined; vertex, triangular, the apex obtuse longer than pronotum, the disc with a distinct median furrow. Front and vertex forming an acute angle, the apex bluntly rounded. Front, flat in same plane as clypeus, the disc flat or concave. Pronotum, short, quadrangular, narrowing posteriorly. Elytra, hyaline or sub-hyaline, rarely coriaceous, the claval nervures often united for a considerable distance in the middle. Anterior tibiæ, sulcate above, often broadened apically.

This genus is closely related to *Phera*, of Stal, but may be known by the broader apex of the vertex and the flat or depressed front.

KEY TO THE SPECIES.

A. Elytra, hyaline, at least on basal half, the nervures distinct, apparently raised.

B. Vertex, but slightly longer than pronotum, evenly irrorate, with fuscous; usually several irregular, reticulate veins between the first cross nervure and the fork of the first sector..... *triquetra*, Fab.

BB. Vertex, one-half longer than pronotum, irregularly lined with fuscous, no extra cross-nervures between the sectors of elytra..... *liturata* n. sp.

AA. Elytra, opaque, the nervures concolorous, the first sectors forked half way between the first cross-nervure and the second .... *insolita* Walk.

HOMALODISCA TRIQUETRA FAB., Plate II, Fig. 1.

Cicada triquetra Fab. Syst. Rhyngt., p. 63, 1803.
Tettigonia vitripennis Germ. Mag. Ent. IV, p. 61, 1821.
Tettigonia coagulata Say. Insects, La., p. 13, 1832.
Tettigonia ichthyocephala Sign An. Soc. Ent. Fr., p. 494, 1854. (vide Fowl).
Proconia admittens Walk. Homop. Supp., p. 227 1858.
Proconia aurigera Walk. Homop. Supp., p. 228, 1858.
Phera vitirpennis Fowl. Bio. Homop. II, p 221, Plate XIV. Figure 1, 1899.

Longer and narrower than in the former genera, with a broad, triangular head, which is rounded at the apex. Elytra, hyaline. Length, 13 mm.; width, nearly 3 mm.

Vertex, as long as its basal width, one-fifth longer than pronotum; disc, flat, sloping, with a median furrow and a depression before each ocellus, apex very bluntly rounding, the lateral margins sharp. Front, sloping, disc concave, rounding up to meet the vertex in a right angle. Pronotum, very coarsely pitted, anterior and posterior margins nearly parallel. Elytra, with the venation strong, usually two or three irregular cross-nervures between the sectors at or before the first fork, the claval veins coalescing for a short distance, then widely separated. Anterior tibiæ, sulcate above and somewhat widened apically.

Color; vertex and pronotum deep testaceous brown, finely and regularly irrorate with yellow sometimes obscuring the brown. Elytra smoky subhyaline usually a broad, somewhat milky band, before the middle and an opaque red spot before the apical cells which sometimes extends forward along the costa. Fresh specimens often have a pruinose spot just before the red one. Face and thorax below orange yellow, a spot on clypeus, sometimes a pair on face, the upper side of anterior tibiæ, mottled on all the femora, and spots from which the spines on hind tibiæ arise, black. Abdomen blue-black above, the lateral margins, broadly on the two basal segments, narrowly beyond, ivory white, the spiracles and a few spots along margin brown. The pygofers orange, abdomen below whitish, the disc of each segment black.

Genitalia; female segment about twice the length of the preceding, slightly narrowing to the lateral angles which are acute, between these the posterior margin is triangularly incised one-third its depth, the apex of the incision is blunt and the margins sinuate. Male plates long, triangular, slightly, concavely narrowing to an acute apex.

Specimens are at hand from Georgia, Florida, Alabama, Louisiana, Mississippi, Texas, and Mexico, and it has been reported from South Carolina. It seems probable that the references of this species to California belong to the following species.

The above synonomy is given with some hesitation. Fowler figures it under the name of *vitripennis* and does not include *triquetra* at all. He evidently had our species

in hand, but his references of *ichthyocephala* Sign. to this form seems doubtful.

HOMALODISCA LITURATA N. SP. Plate II, Fig. 2.

Smaller, narrower than *triquetra* with a longer head. Straw yellow, five irregular brown lines on the head. Length, 11mm; width, 2.25mm.

Vertex one-fifth longer than its basal width, half longer than the pronotum, disc flat, very deeply grooved in the middle. Front very long and narrow, disc flat and in same plane as the clypeus. Pronotum short, disc flat, posterior margin more strongly curved than the anterior one. Elytra very narrow, nervures distinct, a single cross nervure between the sectors situated at over one-third the distance from the fork of the first sector to the base.

Color; vertex pale yellow with five brown lines as follows: a narrow median one expanded on the apex, an interrupted line on either side the middle, arising considerably back of the apex and usually somewhat reticulate anteriorly, a pair of heavier stripes arising either side the apex and running back to the ocelli, their basal portions forming part of the loop that runs from the ocelli around to the eye, the striations of the reflexed part of the front brown. Pronotum yellow, irregularly punctured with brown; usually four distinct dark spots on the anterior submargin. Scutellum yellow with large brown spots sometimes arranged in the form of an **H**. Elytra hyaline, the nervures red, an irregular opaque red patch on the costal half back of the middle, terminating just before the apical cells and omitting an oval hyalin spot in the anterior end of the anteapical cells. Face and legs yellow, a spot on apex of front and anterior tibiæ, fuscous. Abdomen black above, the terminal segment yellow, the lateral margins broadly white, at the base, narrowing apically, the spiracles dark. Below pale, sometimes a median line and the margins of the female segment black.

Genitalia; female segment half longer than the penultimate, the lateral margins parallel, the posterior margin in two slightly rounding divergent lobes, the notch between them narrow and less than half the depth of that in *triquetra*.

Specimens are at hand from Phoenix, Ariz; Yuma, California, and Comondu Lower, Calif, Mexico. The larger head and much narrower form together with the lineate arrangement of the markings will readily separate this form from *triquetra*.

Homalodisca insolita Walk. Plate II, Fig. 3.

Preconia insolita, Walk, Homop, Supp., p. 227, 1858.
Phera insolita, Fowl. Bio. Homop. II., p. 222, pl. xiv, fig. 2, 1899.

Resembling *triquetra*, but smaller and with a smaller head. Dark testaceous, with the anterior half of pronotum and vertex irrorate with yellow. Male sometimes almost black. Length, 10.5 mm.; width, 2.25 mm.

Vertex, no longer than the pronotum, very flat, but little inclined, margins acute, nearly right angled before. Front, convex, disc flat above. Face, as seen from side, much deeper than in *triquetra*, the outline sinuate. Elytra, rather broad, coriaceous; venation, regular, not prominent, the claval veins united for a short distance, the cross-nervure at about the middle of the first sector.

Color: dark reddish brown; a slightly olive tinge in the female. Vertex and anterior half of pronotum irrorate with pale yellow, sometimes a light median line in the furrow. Male very much darker, almost piceus on pronotum and elytra. Front, and below, orange yellow; an ivory band arises on either side the apex of the vertex, below which it is indistinct, running back below the eyes, widening on the thorax and narrowing again on the margin of the abdomen. This stripe is narrowly margined with black, above and below, on the thorax. Fore tibiæ, dark fuscous.

Genitalia: Female segment twice longer than penultimate, the posterior margin triangularly emarginate. The emargination rounds off into a narrow median slit, which extends two-thirds of the distance to the base. Male plates about as long as the ultimate segments, equilaterally triangular, rather stout.

Specimens are at hand from Texas and Arizona, and it is reported from several points in Mexico in the Biologia.

The evenly coriaceous elytra readily separates this from either of the other species. Neither Walker nor Fowler describe the genitalia, which is quite distinct, but there seems little doubt but that this is the form Walker described.

GENUS TETTIGONIA GEOFF.

Head, bluntly conical, but slightly sloping, eyes rarely prominent; ledges over antennal sockets, as seen from above, fused with the vertex margin at apex, not prominent. Front, convex, but not gibbous; vertex convex, confused with the rounding front. Pronotum, rather long, broadest at the lateral angles, the lateral and humeral margins nearly equal in length; posterior margin straight or roundingly emarginate. Elytra, covering the abdominal tergum; venation, simple non-reticulate, often obscured by the color markings. Anterior tibiæ simple.

This genus is world-wide in distribution, and contains a very large number of species of many different forms. Our

species very readily fall into two groups, the first of which under "A" is the more typical and would include most of the tropical species. The second group, "AA," has a reduction in the number of cross-nervures, narrower heads, and the face pushed downwards and forwards, instead of rounding back at the apex, giving the head a much greater depth. This is extremely emphasized in *tripunctata*, and if it occurred here alone there might be reason for generic separation, but a most complete gradation in this character is found running back from this species through *bifida*, *hartii*, *occatoria* and *gothica* to the other extreme in *hieroglyphica*.

KEY TO THE SPECIES.*

A. Elytra with three anteapical cells; head as wide as the pronotum, not as deep as the length of vertex and pronotum together. Face, in profile, strongly curved backwards, usually with the clypeus somewhat angled.

B. Head with a pattern sometimes obscure, but not in the form of definite spots.

C. Head pattern very complex, no parallel lateral bars. Length, over 6 mm..... *hieroglyphica* Say.

CC. Head pattern simple, the lateral bars running back parallel with the median pair. Length, 6 mm. or less ..... *gothica* Sign.

BB. Head with definite spots, not coalescing into a pattern.

C. Greenish blue, face with two stripes, posterior half of pronotum with black spots .... *atropunctata* Sign.

CC. Reddish, face with three stripes, posterior half of pronotum with four longitudinal stripes..... ..... *dohrni* Sign.

AA. Elytra with no cross-nervures between the branches of the first sector before the apical cell (occasional in *occatoria*). Head narrower than pronotum, deeper than the length of vertex and pronotum. Face, in profile, straight or in a single curve, rather long.

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*NOTE:—*Tettigonia lineata* Sign. (= *coeruleovittata* Sign.) although credited to the "United States" in the original description, has not been included in this synopsis as no specimens have been seen from points nearer than central Mexico, and it seems probable that the original reference was an error.

Tettigonia aestuans Walk. is credited to California by Van Duzee, in his catalog, on what authority I do not know. Walker gave "West Coast of America" and Signoret "Para" as habitat for this species. It belongs to a group of distinctly tropical forms, and is doubtless South American in distribution.

B. Head and pronotum with definite longitudinal stripes. ....*occatoria* Say.

BB. Head and pronotum with transverse bands parallel with margin, or none.

C. The outer branch of the first sector forking to form an anteapical cell. Pronotum with transverse bands parallel to the margins.

D. Green, vertex blunt, alternate transverse bands of light and dark on pronotum and vertex.

E. Elytra green, the nervures black. Length, 5.5—6 mm.....*bifida* Say.

EE. Elytra green, the nervures pale or obscure, three white spots before the the apex. Length, 4.5—5 mm., much narrower than above.*geometrica* Sign.

DD. White, vertex longer, with three black spots. Elytra white, the nervures brown. .....*tripunctata* Fitch.

CC. The outer branch of the first sector, with its outer fork running to the margin. Pronotum, without marginal bands. Form, short and stout. .... *hartii*

Tettigonia hieroglyphica Say. Plate III.

Tettigonia hieroglyphica Say. Jour. Acad. Nat. Sc. Phil. VI, p. 313, 1831.

Rather stout; vertex bluntly conical. General color, reddish or greenish on pronotum and elytra usually mottled, costa and claval suture often broadly light, the markings on vertex in a complex pattern. The broad median band of scutellum light. A black spot on apex of vertex. Face, mottled; sometimes the whole insect is black. Length, 6—7 mm.; width, 1.5 mm.

Vertex, slightly conical, bluntly right-angled, the lateral margin in advance of the margin of the eye; over three-fourths the length of the pronotum not quite three-fourths its basal width. Face, as seen from side, rounding back. Elytra, rather broad and compact; five apical and three anteapical cells.

Genitalia; female segment two and one-half times as long as the penultimate, slightly narrowing posteriorly; posterior margin triangularly produced, the apex produced and rounding, who e segment thin and membranous, strongly curved around the pygofers. Male plates two and one-half times as long as the ultimate segment, long-triangular, their apices acute, margins fringed with soft hairs.

The following varieties intergrade, but most of the specimens will readily fall into one of the following forms:

VAR. HIEROGLYPHICA, Say. Plate III, Fig. 1.

Red form—Structure as above. Color, a round black spot on the apex of vertex and face surrounded by a broad circular

band of white; from this on either side there is a band around the margin of the vertex to the eye, and usually a band runs down the middle of the front. Front irregularly mottled with black and white. Lorae and genae pale, clypeus white, with a median black band. Vertex with a median light line arising from a transverse spot at base, forking just before the middle the two forks angularly divergent, and again angularly recurved, forming a **T**, with the top piece broken upward to form nearly a right angle above; a band against either eye, from the anterior end of which a crescent extends in, nearly to the top of the **T**, an oblique line running in from behind either eye, sometimes interrupted to form a spot just inside either ocellus, white. Pronotum, reddish, with irregular creamy markings, usually the anterior margin is lighter, with definite markings, often a creamy band extends back from either eye and joins a band around the posterior margin. Scutellum, with the median half white, interrupted in the middle, a pair of round black dots in the anterior quadrangular part, a pair of white dashes along the middle of the lateral margins. Elytra, reddish, the costal and sutural margins, a line on either side the claval suture and a line between the claval nervures pale creamy, sometimes some irregular mottlings on the disc of the corium.

Slaty form—Size and structure of the preceding form. Color slaty green, varying to fuscous, markings as in the preceding species, except that the light markings of the vertex are usually reduced in size. Face in the female often nearly all light, except for the black spots on the clypeus and apex of head; in the male, often black, with small light spots. Pronotum with a pale area behind each eye, in the middle of which there is a black spot, the dark marking along the anterior margin sometimes forming definite spots. Light stripes on elytra, often broad, especially the pair next the claval suture. Light markings, often with a tinge of blue.

VAR. DOLOBRATA NOV. VAR., Plate III, Fig. 2.

Somewhat smaller than the preceding. Shining black, a few of the white markings of the typical form persisting, as follows: the margins of the clypeus, the genae, a line below the margin of the pronotum, the circle around the apex of head, a line against the eye, and the marking of the scutellum. Often there is part of a median line on vertex and a pair of slender lines running from the inner corner of the eye back across the pronotum to the light margined claval suture.

VAR. UHLERI NOV. VAR., Plate III, Fig. 3.

Slightly stouter than typical *hieroglyphica*, elytra often considerably longer; grayish green, with light blue-green mottlings; black markings on vertex and scutellum much reduced in size and intensity, remaining only as narrow lines margining the original white pattern, giving quite a strikingly different appearance to the vertex. The whole central area is now light from the apical circle back, a pair of approximate lines on the basal half and a heavier pair between them and the ocelli converging before the middle. The

areas between the ocelli and the eyes are ligh', often partly enclosed by a black circular line and with a heavy black spot in the middle. The reflexed portions of the front striated with dark. Pronotum, as in other forms, the markings smaller and more numerous. Elytra mottled with blue-green, the nervures somewhat fuscous, claval sutures often broadly light.

Reddish form—Reddish, pronotum and elytra mottled with creamy, anterior margin of pronotum and scutellum distinctly reddish, dark markings often obscure or wanting, the outer pair of lines on vertex often enlarged, somewhat lobed.

VAR. CONFLUENS UHL., Plate III, Fig. 4.

Proconia confluens, Uhler. Proc. Acad. Nat. Sc., Phila., p. 285, 1861.

Stouter than even the preceding varieties, elytra usually long nearly parallel margined. Dark testaceous, shading to fuscous, elytra slightly and obscurely mottled. Vertex and scutellum fuscous, a few of the light markings of *uhleri* persisting, as follows: a dash back of the apex of vertex, three lines on the disc, a transverse spot at base and a margin next the eyes. Often light markings on pronotum, the lateral ones arranged in rows, apex of scutellum light. The face is usually light, with dark mottlings. Elytra often with the mottlings arranged in light stripes, especially along costa and claval suture.

This species, as a whole, is very variable in size and color, and recalls *O. undata* and *lateralis* in their red, green and black forms. The varieties readily fall into two series on structural characters. The first has *hieroglyphica*, and *dolobrata* as the extreme in darkening up. These forms are the only ones found in the Mississippi valley and as far west as central Kansas; they occur also in Texas, Arizona and Mexico. The second series has *uhleri* as the common form, and *confluens* as the dark extreme. The *uhleri* is the common form in Wyoming, Colorado, Arizona and New Mexico, and extends westward to the coast. The specimens from the western coast, including Idaho, are much larger, and have longer elytra, and are mostly *confluens*.

Specimens of this species are at hand from Illinois, Iowa, Missouri, Nebraska, Kansas, Arkansas, Texas, Wyoming, Colorado, Utah, New Mexico, Arizona, Idaho, Washington, Vancouvers Island, Oregon, California and Mexico. All specimens received as *hieroglyphica* from points east of Illinois belonged to the following species:

TETTIGONIA GOTHICA SIGN., Plate IV, Fig. 1.

Tettigonia gothica Sign. An. Soc. Ent. Fr., p. 345, 1854.

Tettigonia similis Woodw. Bull. Ill. St. Lab. III., p. 25, 1887.
Tettigonia hieroglyphica, in ref. from Eastern States (nec Say).

Smaller than *hieroglyphica*, which it much resembles, pale reddish or grayish green, with several nearly parallel lines on the disc of the vertex and a point at apex black. Length, 5.5—6 mm.; width, 1.25 mm.

Vertex slightly narrower and more pointed than in *hieroglyphica*, three-eighths wider than its middle length, over two-thirds the length of the pronotum, the margins rounded, apex slightly conical, the lateral margin rounding directly to and confluent with the margin of the eye. Front and clypeus as seen from side are evenly rounding, the rostrum reaching back to the scutellum. Elytra with the nervures somewhat more pronounced than in *hieroglyphica*, venation similar.

Color; head pale reddish or greenish yellow, apex with a black point surrounded by a light circle. Front all light or with a light median stripe and numerous short fuscous arcs. Clypeus unmarked or with but a minute black point. Vertex with the margins of the reflexed portions slightly angularly lined, a line from the angle following the suture to the ocelli, inside of these on the disc there is a pair of loops, their outer limbs often curving around to the ocelli and sending a branch back to the posterior margin. These loops often reduced in size to feeble lines, and their inner limbs sometimes broken or wanting. Pronotum with the anterior third light yellow, disc olive or brownish, sometimes with a distinct pattern, often without definite marking. Scutellum with the median half of posterior disc light, margins and anterior disc often clouded with fuscous. Elytra grayish green or reddish unicolorous with the nervures light, or mottled with creamy yellow, the nervures slightly darkened.

Genitalia; female segment nearly three times the length of the penultimate, the posterior margin triangularly produced, whole segment transversely convex. Male plates long, triangular, two and one-half times as long as the penultimate segment, nearly half longer than their combined basal width, their margins fringed with hair.

Specimens have been examined from Maine, New Hampshire, Vermont, District of Columbia, New York, Ohio, Illinois, Kentucky, Alabama, Iowa, Nebraska, Kansas, Colorado, Arizona and southern California; and besides these, it has been reported from New Jersey (*similis*), and Ottawa, Can. and Massachusetts (as *hieroglyphica*). This species has been very generally confused with *hieroglyphica* and reported under that name. All specimens determined as that species that have been received and examined from points east of Illinois have proved to

belong to this one, and it seems quite certain that all records for *hieroglyphica* from farther east than that, should be referred to this species. Typical examples of *similis* determined by Woodworth have been examined.

Tettigonia atropunctata Sign., Plate IV, Fig. 2.

Tettigonia atropunctata Sign. An. Soc. Ent. Fr., p. 354, 1854.
Tettigonia cir illata (Uhler MS.). Baker (descrip.) Psyche VIII, p. 285, 1898.
Tettigonia atropunctata Fowl. Bio. Homop. II, p. 266, Pl. 17, Fig. 27, 1900.

General form of *hieroglyphica* somewhat narrower, vertex and pronotum each with about five black spots. Posterior half of pronotum and elytra blue. Length, 6—7 mm.; width, 1.25 mm.

Vertex bluntly rounded, slightly narrowed at the eyes, two-thirds the length of the pronotum. Face, as seen from side, similar to *gothica*, clypeus slightly prominent, elytral venation similar to that of *gothica*.

Color; head pale yellow, sometimes washed with pale blue, a black spot at the apex, surrounded by a pale circle. Front with a stripe either side of the middle, the lateral margin and the clypeal suture black, the two stripes are often effaced in the middle, leaving only a dash at the ends, clypeus with a black dash, vertex with a spot on the middle, a dash against each ocellus on the outside, and a crescent on either side anteriorly along the line of the frontal suture. Pronotum with the anterior half pale, broadest behind the eyes, a black spot behind the outer corner of either eye, a pair just inside the eyes on the sub-margin, and three dots between these latter. Posterior half bright blue, with a large transverse spot behind the middle on either side, and a small dot or longitudinal spot between them. Elytra bright blue, the nervures narrowly black. Legs, orange.

Genitalia; female segment three times the length of the preceding, the median line elevated into a strong keel, posterior margin strongly angled, the apex formed by the convex keel. Male plates long, slender, style-like, about three times the length of the ultimate segment, the margins with fine hairs.

Numerous specimens are at hand from Arizona and California. It is reported as being one of the most abundant and injurious Jassids in southern California.

Signoret described this species from Brazil, and Fowler has it (figured) from Mexico. Neither author's figures are very good for the insect as it occurs in our territory, but Signoret's description, which is very full and complete, and includes face markings and genitalia, both very striking and distinctive, leaves no doubt as to this being the species

described. Specimens labeled *circillata*, in Baker's handwriting, are in the National Museum collection.

Tettigonia dohrnii Sign. Plate IV, Fig. 3.

Tettigonia dohrnii Sign. An. Soc. Ent. Fr., p. 792, Pl. 24, Fig. 13, 1855.
Tettigonia aurora (Uhler MS.) Baker (description.) Psyche VI, p. 286, 1898.
Tettigonia dohrnii Fowl. Bio. Homop. II, p. 268, 1900.
Tettigonia delicata Fowl. Bio. Homop. II, p. 269, Pl. 18, Fig. 5, 1900.

Resembling *atropunctata* in structure, rather longer and narrower. Head and anterior part of pronotum pale, with transverse rows of spots, rest of pronotum and elytra pale reddish, with darker stripes. Length, 7 mm.; width, 1.25 mm.

Vertex, bluntly rounding, three-fourths the length of the pronotum, narrower than in the preceding species, the disc very flat, slightly transversely depressed. Eyes, small, hardly as wide as the pronotum at the lateral angles; pronotum, rather long, narrowing anteriorly. Elytra, long and narrow; venation of the *hieroglyphica* pattern, the anteapical cells longer and narrower; outline of face as in that species.

Color; vertex, pale creamy; a spot at the apex, which is one of five equidistant ones on the anterior margin, and behind these a pair of oblique dashes with their inner ends enlarged and obliquely truncate; black. Posterior sub-margin with four quadrate reddish spots, the inner pair elongate. Front, pale; three longitudinal lines, the median line not reaching the apical dot, either side of which there is a black dash below, a pair of spots below the antennal pits, another pair below these, and a third pair on the genæ. Clypeus, with a black dash above. Pronotum, with the anterior part light, broadening out behind the eyes, the sub-margin with six quadrangular reddish fuscous spots in a row; posterior disc tinged with reddish, with four longitudinal testaceous lines, the outer pair short and divergent; scutellum, yellow, with the transverse suture, and three dots at base, reddish fuscous; sometimes the basal dots are extended into longitudinal lines. Elytra, broadly pale along the nervures, the central portion of the cells darker. Legs, yellow.

Genitalia; female segment over twice the length of the penultimate; posterior margin, broadly roundingly produced; disc, convex. Male plates, one-third longer than the ultimate segment; rather broad at base, rapidly narrowing to the long acute points, which are much exceeded by the pygofers.

Specimens are at hand from Arizona and Mexico. The Arizona specimens are from the Van Duzee collection, and bear the label, "Ariz. C. U., Lot 34," and under this, "Cornell U., Lot 45, Sub. 410." They were sent to Prof. Van Duzee as *T. aurora* Uhler, and are doubtless from the

same lot as the two specimens Baker described. The Mexican specimens are paler and answer the Signoret description, except that there are four longitudinal stripes on the pronotum. One of the Arizona specimens has the median pair coalesced, which would give the three stripes of his description and figure.

Tettigonia occatoria Say. Plate IV, Fig. 4.

Tettigonia occatoria Say. Jour. Acad. Nat. Sc. Phila. VI, p. 311, 1831.
Tettigonia compta Fowl. Bio. Homop. II, p. 271, Pl. 18, Fig. 11, 1900.
Tettigonia occatoria Fowl. Bio. Homop. II, p. 279, Pl. 18, Fig. 29, 1900.

Smaller than *dohrnii*, which it resembles in form; longer and narrower than *gothica*. Pale, with four divergent stripes on head and five parallel ones on pronotum; dark brown. Elytra, with a transverse white band before the apex. Length, 6 mm ; width, 1 mm.

Vertex, nearly flat, rather long, angled with a blunt point, the length and breadth at base equal; almost as long at pronotum. Pronotum, broader than the eyes. Elytra, long and narrow; venation, obscure; two apical cells, sometimes three. Outline of face, as seen from side, almost straight, resembling *bifida*.

Color; vertex, yellow, a black spot on the apex just below the margin; a stripe arising just outside and behind the apex on either side running back between the ocellus and the eye; a median dash some distance from apex, which abruptly terminates in a pair of stripes, which run back parallel with the first pair, but inside the ocelli. Pronotum, with five stripes, the median one arising on the base of the vertex and continuing to the apex of scutellum; another pair of stripes arising beneath the eyes and running back below the margin of the pronotum onto the elytra, where, together with the two pairs from the head, they break up into six stripes on each side, of which the outer pair furnishes three on the corium and the other two pairs the three on the clavus. These stripes are of a velvety brown, the outer pair darker anteriorly. The space between these stripes, the margins of the elytra, except the apical, some shade of yellow. Just before the apex of the elytra is a crescent-shaped, transverse band, which may be yellow or hyaline. Face and below, pale yellow; a few short fuscous arcs on the side of the front. Legs, pale.

Genitalia; female segment scarcely twice the length of the preceding; posterior margin obtusely rounding or almost truncate. Male ultimate segment very short; plates rather broad-triangular, their apices slightly produced; much exceeded by the pygofers.

Specimens are at hand from Florida, Mississippi and Texas, where it is apparently common. It is also a common Mexican insect. Specimens are at hand from many localities, but the two commoner forms are somewhat

different in color and both strikingly different from the form from the United States. One of these forms has the stripes black, the disc of the pronotum and elytra blue-green, with very faint stripes; often a bright blue band inside the claval suture. The other variety has the stripes very broad and definite, of a blue-black; the spaces between the stripes yellow on vertex, becoming greenish on the pronotum and bright green on the elytra. Throughout this variation the structure and pattern remains the same, except that the transverse light band at the apex of the elytra is often much broader or doubled by a narrow, black line. Fowler figured this latter variety as *occatoria*, and described our common form as *compta*. His two following species, *tunicata* and *sororia*, probably also belong here.

Tettigonia bifida Say. Plate V., Fig. 1.

Tettigonia bifida Say. Jour. Acad. Nat. Sc., Phil. IV, p. 313, 1831.
Tettigonia tenella Walk. Homop. III, p. 770, 1851.
Tettigonia fasciata Walk. Homop. III, p. 780 1851.
Tettigonia bifida O. & B. Ia. Acad. Sc. IV, p. 175, 1897.

Head short and blunt. Color green, alternate circular bands of light and black on head and pronotum, nervures broadly black. Length, 5.5—6 mm.; width, 1.2 mm.

Vertex short, conical, half the length of the pronotum, nearly twice wider than long, eyes small, narrower than pronotum at the lateral angles. Elytra broad, venation simple, no cross nervures between the sectors before apical cells, outer fork of first sector again forking near its middle. Face, as seen from side, very gently curved.

Color; vertex black, the concave posterior margin with a light band which extends behind the eyes, another light band parallel with this across the disc, just in front of the ocelli, a spot on either side of the apex, sometimes connected with the anterior band by divergent lines. Ledge above antennæ black, margined with light. Face pitchy, outer margin of genæ and the suture between front and genæ narrowly light, sides of front against antennæ rufous. Pronotum with a broad black band on the anterior margin, broadest in the middle, bordered behind by a narrow light band, the humeral and posterior margins with a narrow band of ivory white, in front of which there is a broader band of black, sometimes this band margined in front by another pale one, the disc green. Scutellum yellow, with the transverse impression black. Elytra green, the nervures black, except for the apical cells, which are entirely smoky. Legs, yellow.

Genitalia; female segment about half longer than the preceding one, the posterior margin with the median half slightly roundingly produced, whole segment very convex. Male plates scarcely as long as the ultimate segment, equilaterally triangular, their apices slightly divergently produced. Plates less than half the length of the pygofers.

Specimens are at hand from New Hampshire, Vermont, New York, District of Columbia, Ohio, Iowa, Kansas, Florida, Tennessee, Alabama, Mississippi, Mexico and the West Indies. It occurs all over the eastern half of the United States from Canada to Florida, west to Iowa and Mississippi, and on into eastern Kansas and Nebraska; but a careful search in the west ends of these states and in Colorado has failed to find it.

Tettigonia geometrica Sign. Plate V, Fig. 2.

Tettigouia geometrica Sign. An Soc. Ent. Fr., p. 12, Pl. 1, Fig. 12, 1854.
Tettigonia geometrica Bak. Psyche VIII, p. 285, 1898.

Resembling *bifida* in form and color, but smaller and lacking the black lines on the elytra. Length, 4.5—5 mm.; width, scarcely 1 mm.

Vertex slightly shorter than in *bifida*, elytra narrower, venation similar, the fork of the outer branch of the first sector occurring well behind the middle instead of at or before it, as in *bifida*, and its branches somewhat more divergent.

Color; vertex black, with the two light crescentiform bands as in *bifida*, the anterior one narrower and almost broken on the frontal sutures; the two spots at the apex larger, approximate. Face black, the antennæ and the margins of the ledge above light. Pronotum and scutellum as in *bifida*. Elytra bright green, the apical cells smoky, margined in front by three pale spots, the outer one the largest; the costal margin and usually the outer branch of the first sector light yellow. Some Florida males are much darkened up, but the light spots on the wings remain or become enlarged.

Genitalia; as in *bifida*, but so much smaller that they are made out with difficulty.

Specimens are at hand from the District of Columbia, Ohio, Kentucky, Florida, Arkansas and Mexico. Besides these, it has been reported from Illinois, Alabama and Louisiana. The Ohio River seems to be nearly its northern limit, as it has only been taken in southern Ohio and Illinois, and careful collecting in Iowa has not revealed it. It doubtless occurs throughout all the Southern States from

Maryland and Illinois south to Florida and Texas, and on through Mexico to South America.

Readily separated from *bifida* by the much smaller size and the green elytra with the three white spots before the smoky apex. Some Florida males are almost black, and might be confused with *hartii* males, if they were not so much more slender than that species.

Tettigonia tripunctata Fitch. Plate V, Fig. 3.

Tettigonia tripunctata Fitch.' Homop. N. Y. St. Cab., p. 55, 1851.
Not *Tettigonia tripunctata* Sign. Monog. No. 175; Fowler Bio., p. 253.

Resembling *bifida* in form and structure, smaller, and with a longer head. White, with the nervures and three spots on vertex, black. Length, 5 mm.

Vertex long, conically pointed, almost as long as the pronotum. Pronotum as wide as the eyes at the lateral angles, narrowed in front. Elytra inclined to be flaring, venation simple, no cross nervures between the sectors, the second fork of the first sector occurring beyond the middle of the outer branch, the two veins often scarcely separated. Face, as seen from side, gently curved, very deep.

Color; white, vertex with a spot on the apex, and circles around the ocelli black, a few brown arcs on the reflexed portion of front and often a brown point on the middle of the disc. Front with very short brown arcs, the ends of which are enlarged and form four longitudinal lines, the two on either side uniting just before the clypeus and extending below the middle of that piece where they unite. Pronotum with the margins very narrowly lined with brown, two transverse bands on the disc, one parallel with each margin, equidistant on the median line, the posterior one abbreviated. Scutellum with an abbreviated median brown line. Elytra with the margins, nervures and claval suture narrowly lined with brown, paler at the apex. Legs and below pale.

Genitalia; female segment nearly twice the length of the preceding, slightly rounding or truncate posteriorly. Male plates broad at base, obtusely triangular, their apices produced into attenuate points; the whole scarcely as long as the large ultimate segment.

Specimens are at hand from Maryland, District of Columbia, New Hampshire, New York, Ohio and Mexico, and it has been reported from Canada, Illinois, Mississippi and Missouri.

The Mexican specimens have the vertex much broader and blunter, as in the Mexican form of *bifida*, and the spot on the center of the disc is distinct and black. Fowler in

the Biologia follows Signoret in his use of *tripunctata*, but as suggested by Van Duzee, Ent. News V, p. 155, this is evidently a mistake and refers to a distinct species which should be called *nigrifasciata* Walk., and which should not only include *pallida* and *albida* but also *uniguttata* and *candida* of Walker. The markings on the head and pronotum are quite different and the genitalia as described by Signoret could not apply to the true *tripunctata*. As described and figured by Signoret *nigrifasciata* should be close to *venusta* Stal., which belongs to the *gothica* group with the retracted face.

Tettigonia hartii, Plate V, Fig. 4.

Tettigonia hartii Wood. MSS.

Form and structure of *tripunctata*, but shorter and much stouter built, especially the head. Female slaty gray, median line of front and nervures lighter. Male much smaller, shining black. Length, ♀ 4.5--15 mm.; ♂ 3.75--4 mm; width, ♀ 1.25 mm.; ♂ scarcely one mm.

Vertex obtusely rounding, conical, two-thirds the length of the pronotum, twice wider than long, the ocelli placed near the anterior margin and on the inner margins of depressed areas. Pronotum broad, flat. Elytra broad, venation similar to *bifida*, a cross nervure forming the inner anteapical cell, the second fork of the outer sector rarely closed behind to form the outer anteapical cell, usually curving away to the costa. Outline of face as seen from side, rounding, face very deep.

Color; female; vertex pale yellowish or brownish, the ocelli and a pair of spots within and behind them, on the posterior margin black. Ocelli often with light circles; in front of the ocelli the vertex is abruptly darker, except for the light spot on apex. Front piceus or brown, a definite median white stripe which enlarges above to form a spot on apex of vertex and often extends onto the dark clypeus below, about twelve pairs of pale arcs on either side. Loræ and genæ pale. Pronotum slaty or brownish, the anterior margin pale, broadening out behind the eyes where it enclosed a black spot; sometimes a pair of spots on the anterior sub-margin behind the basal pair on the vertex. Scutellum pale, a triangular spot within either basal angle. Elytra slaty gray, the nervures pale yellow, claval margins often lined with light blue. Male; shining black, often with circles around the ocelli and the apex of scutellum pale, the spot on apex of vertex white, the median line on front black, the rest of front tinged with rufous, margin of genae pale.

Genitalia; female segment about half longer than the preceding one, posterior margin truncate, slightly incised either side the middle

forming a very slight median tooth; male plates very short, bluntly triangular, not as long as the ultimate segment, less than half the length of the pygofers.

Specimens are at hand from southern Ohio, a pair each from southern Illinois, Florida and Mississippi, and several females from Texas, New Mexico and Cuba. The specimens from New Mexico and Cuba have the elytra very dark, with the light nervures in sharp contrast.

Genus Helochara, Fitch.

Similar to *Tettigonia* in form, head wider than thorax, much broader than long, slightly conical, slightly obtusely angled, reflexed portions of front elevated, prominent. Face well rounded back, profile convex. Pronotum very long, sexangular, resembling *Aulacizes*, lateral margins short, humeral margins very long, the humeral angles rounding to the short medially emarginate posterior margin. Scutellum very small, covered almost to the transverse suture by the pronotum. Elytra coriaceous, veins distinct, raised; venation simple, regular; three anteapical cells and five apical ones. Male antennae with the apical third developed into a flat plate.

Helochara communis Fitch. Plate VI, Fig. 1.

Helochara communis Fitch. Homop. N. Y. State Cab., p. 56, 1851.
Tettigonia herbida Walk. Homop. III, p. 769, 1851. (Not Sign. Monograph No. 167, nor Uhler Hemip. Homop. St. Vinc., p. 77 (=*similis* Walk.))

Small, robust, deep green, superficially resembling *reticulata* or the male of *mollipes* var., *minor*. Length, ♀ 6—7 mm.; ♂ 4—5.5 mm.; width, 1.25 mm.

Vertex a trifle less than two-thirds the length of the pronotum roundly, obtusely angled, the margin blunt, reflexed portion of front prominent, striated. Front sloping well backwards, outline convex or slightly angled above the middle, again on clypeus. Pronotum very long, deeply angled behind. Scutellum very small, less than half the length of the pronotum. Elytra coriaceous except at apex, venation regular, the anteapical cells almost parallel margined. Whole dorsal surface microscopically pustulate.

Color deep green, often fading to pale yellowish olive, except for stripes along the claval suture. The eyes ocelli frontal suture and about four concentric lines on the reflexed portions of front dark. Face and below, pale olive, with about nine dark arcs on front in the female, front usually black in the male.

Genitalia; female segment but little longer than the penultimate, broad and flat, the posterior margin slightly produced in the middle. Male valve broad and short, plates finger-like, triangular, very slightly longer than the ultimate segment.

Specimens are at hand from Ontario, Vermont, New York, District of Columbia, Virginia, Ohio, Tennessee.

Iowa, Colorado, Vancouvers Island, British Columbia and Mexico, and it has been reported from Nova Scotia and Hudson Bay, by Walker. It appears to range the continent from Hudson Bay and British Columbia on the north to at least southern Mexico on the south.

Genus Diedrocephala Spin.

Head narrower than pronotum, eyes small, vertex flat or concave except on posterior margin, roundingly angulate, the apex obtusely rounding, the margins sharp, acute, or very slightly rounded and usually dark lined. Front broad, almost flat above, as seen from side evenly rounding, in the same curve with clypeus. Pronotum broadest across lateral angles, the side margins continuous with the curve of anterior margin, strongly curved in front, posterior margin broadly, slightly emarginate. Elytra rather long, coriaceous, obscuring the venation; venation of the same pattern as in *Tettigonia*, except that the apical cells are usually longer and narrower. Anterior tibiæ round or prismatic.

This genus was founded on a South American species (*variegata*) in which the head is very similar to that of *coccinea*, but the apex of the elytra is slightly emarginate in the middle and the outer cells very weak and obscure; the venation, however, is essentially the same as in *coccinea*, and the notch in the elytra, while distinct in a few species, is variable or wanting in others from the same region and appears to be a specific rather than a generic character.

KEY TO THE SPECIES.

A. **Vertex unmarked except for a black band on the anterior margin. Species robust 8 mm. or over.....*coccinea* Forst.**

AA. **Vertex with black markings nearly parallel with the anterior margin which is usually black lined, often a pair of approximate median lines on the disc. Smaller 6 mm. or under..... ....*versuta* Say.**

Diedrocephala coccinea Forst. Plate VI, Fig. 2.

Cicada coccinea Forst. Nov. Spp. Ins., p. 96, 1781.
Tettigonia quadrivittata Say. Jour. Acad. Nat. Sc. Phila VI. p. 312, 1831.
Tettigonia picta Walk. Homop. III, p. 758, 1851.
Tettigonia teliformis Walk. Homop. III, p. 764, 1851.
Diedrocephala coccinea Osb. & Ball. Iowa Acad. Sc IV. p. 177, 1807.
Tettigonia quadrivittata Fowl. Bio. Homop. II, p. 276, Pl. 18, Fig. 20, 1900.
Tettigonia idonea Fowl. Bio. Homop. II, p. 276, Pl. 18, Fig. 22, 1900.

Reddish with green stripes on pronotum and elytra. Vertex orange, black margined. Length, ♂ 9 mm.; width, 1.75 mm.

Vertex slightly convex except before the apex, slightly acutely angled, margins rounding to the acute apex, two-thirds the length of the pronotum. Face distinctly convex as seen from side, the front broad. Elytra long, narrow at the apex, the apical cells long and narrow—the second one especially so, outer anteapical cell acuminate anteriorly.

Color; face and vertex yellow, separated by a broad black band, striated just below the margin, a line on either side extending in on the suture, sometimes angled to the ocellus. Pronotum reddish, a narrow band on the anterior margin in the middle, a broad median stripe extending in from the posterior margin, connected behind with a pair of oblique stripes from the humeral angles, deep green. Scutellum yellow, impressed line often dark. Elytra red, the costal margin, the sutural margin before the middle, the claval suture and a median stripe on corium, green, the appendix black, legs and below yellow. The black margin to vertex continued across eye and under the margin of pronotum. Sometimes the vertex and scutellum are washed with red or the green stripes on pronotum coalesce leaving only a spot on either side of the disc, red.

Genitalia; female segment nearly twice as long as the preceding, posterior margin acutely rounding back to the lateral margins. Male plates long triangular, concavely attenuate, two-thirds the length of the pygofers nearly half longer than the ultimate segment.

Specimens have been examined from Ontario, New Hampshire, Vermont, New York, Connecticut, District of Columbia, Georgia, Alabama, Tennessee, Florida, Kentucky, Mississippi, Ohio, Illinois, Iowa, Michigan, Minnesota, Missouri, Nebraska and Kansas. It ranges from Canada and Maine to Florida, west to central Nebraska and Kansas, and south to Mississippi and Texas and on to Mexico and Central America.

DIEDROCEPHALA VERSUTA SAY. Plate VI, Figs. 3, 4, and 5.

This is another very variable species in color markings and somewhat so in form. Nearly all gradations between these three varieties will be found but the following key will readily place all the specimens examined in their correct variety.

A. A black band on anterior margin of vertex.....*versuta* Say.

AA. The anterior margin of vertex without a band, a black spot at apex.

B. A pair of black spots against eye in front sometimes wanting, a few fuscous arcs on margin but not reaching spot at apex.....*lineiceps* Spin.

BB. Margin all pale except for spot at apex and one on each side near it..... .....*cythura* Bak.

Var. versuta Say. Plate VI, Fig. 3.

Tettigonia versuto, Say. Jour. Acad. Nat. Sc, Phila., p. 311, 1831.
Tettigonia redacta, Fowl. Bio. Homop. II, p. 276, pl. 18, fig. 21, 1900.

Resembling *coccinea* but smaller, reddish or yellowish, with definite lines on vertex and scutellum. Length, 5-6 mm.; width, 1.25 mm.

Vertex flat, except for posterior margin between the ocelli, nearly right angled the apex blunt, the lateral margins very slightly rounding, four-fifths the length of the pronotum. Face feebly convex, acutely angled with vertex. Elytra moderately long, venation as in *coccinea*, the outer anteapical cell sometimes broken up or wanting.

Color; vertex pale yellow, a black stripe just over the margin on front, a pair of slender, approximate, median lines which are joined anteriorly to a pair of broken lines just inside and almost parallel with the margins and running back inside the eyes, interrupted by the black sutures which inclose the ocelli. The space between these lines almost white. Pronotum, pale yellow in front, green behind. Scutellum yellow, three longitudinal stripes in front of the transverse suture and two behind; sometimes a pair of dots inside the basal angles. Elytra geen, the claval suture with a blue stripe, either side of which is a broader red one, the inner pair of stripes sometimes extending forward across the pronotum and converging on the vertex, apical margin and posterior third of costa pale, with numerous triangular spots. Face and below, pale yellow.

Genitalia; female segment nearly twice as long as the penultimate, the disc longitudinally elevated, posterior margin obtusely, angularly produced, the sides a little concave; male plates a little longer than the ultimate segment, concavely acuminate, their black tipped apices curving up around the pygofers, side margins with fine hairs.

Specimens of this form are at hand from the District of Columbia, Maryland, Virginia, North Carolina, Georgia, Florida, Ohio, Illinois, Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, and various parts of Central Mexico.

Var lineiceps, Spin. Plate VI, Fig. 4.

Tettigonia liniceps, Spin. Fauna Chilena, p. 283, 185–.

Form and size of variety *versuta* nearly. Vertex slightly shorter, blunter. Color green, vertex yellow, the marginal band reduced to three spots, one on apex and one against either eye. The stripe on either side just inside the margin, with a broad green margin behind, extending back to the oscelli. Scutellum orange yellow.

Elytra without the red stripes, and with but two or three black spots at tip. Sometimes the spots next the eye in front are wanting, and there are two or three fuscous arcs on the upper part of front, which leads to the next variety.

Specimens of this variety are at hand from Texas and Mexico. It was described from South America.

Var cythura, Bak. Pl. VI, Fig. 5.

Tettigonia cythura, Baker. Psyche VIII, p. 268, 1898.

Vertex slightly shorter than in the preceding variety. Slightly smaller.

Color; vertex and anterior part of pronotum pale yellow, the marginal band reduced to a spot at apex and a smaller one each side one-third the distance to the eyes, the lines inside the margin and dashes against the eye as in the typical form, median lines a little broader and shorter, often about five spots along the front margin of pronotum. Elytra bright green, red bands obsolete, blue ones pale, black spots at apex small or wanting, nervures slightly fuscous.

Specimens are at hand from California, and Lower California and Mexico, and Baker reports it from Arizona. This variety represents the same change in form and color for this species that is shown in the Mexican varieties of *occatoria*, and the same broadening and shortening of the vertex that is seen in the Mexican forms of *bifida* and *tripunctata* and the *confluens* form of *hieroglyphica*. Specimens of this form labeled *Tettigonia cythura*, Uhl., in Baker's handwriting are in the National Museum collection.

Genus Draeculacephala nov. gen.

Similar to *Diedrocephala* the vertex usually longer and more acutely angled. Face, as seen from side, usually straight, or slightly concave to the middle of clypeus, where it is broken backwards. Disc of clypeus quite gibbous. Pronotum with the lateral margins parallel, narrower than or only equaling the eye. Elytra long, narrowing apically greenish, the nervures raised distinct, the apical and the anteapical cells irregularly reticulate veined. Anterior tibiae slender, round. Type of the genus *D mollipes*, Say.

This is quite distinctively a temperate region group, only a few of the forms extending very far southward. The reticulate venation, while only a trivial character, will at once distinguish the typical forms. The

larvæ of these forms show quite as much divergance from the general Tettigonia form as do the adults.

A. Front, as seen from side, straight or concave above, clypeus definitely angled. Sides of front with numerous dark arcs.
  B. Vertex long, acute, margins as seen from above straight, apex with minute spots or none. Profile of front straight. A pair of black stripes beneath the eyes in line with the margins of the elytra.
    C. Vertex in the female longer than the pronotum, distinctly longer than broad. Lines on vertex rarely broad. Size small, male segment broad..... ..... *mollipes*, Say.
    CC. Vertex in female slightly shorter than pronotum, distinctly shorter than broad, face deep; lines on vertex broad, distinct. Size large, female 10 mm. or over. Male segment long, cylindrical .... *angulifera*, Walk.
  BB. Vertex shorter, stouter, margins as seen from above slightly rounding, two dark spots on apex and another pair on margin against eye. Profile of front slightly rounding.
    C. Vertex acutely angled, longer than pronotum in the female, the lines distinct, heavy; male vertex with a dark wedge back of the apex and a pair of oblique ovals on the disc. Spots at apex and against eye small..... *manitobiana*, n. sp.
    CC. Vertex scarcely less than a right angle, eyes much wider than pronotum, the lines on vertex pale, spots at apex and against eye large, black..... ..... *novaeboracensis*, Fitch.

AA. Front, as seen from side, slightly rounding. Clypeus rounding or weakly angled, front and vertex mottled with brown or unmarked, never lined.
  B. Vertex acutely angled, longer or about equalling the pronotum, elytra with few coarse reticulations.
    C. Vertex very acutely pointed, apex curved upwards, half longer than between ocelli, vertex evenly mottled. Length of male, 6.5 mm..... ..... *floridana*, n. sp.
    CC. Vertex moderately acute, the apex blunt, rounding. No longer than the distance between ocelli, a triangular mark back of apex. Male 5 mm. or less ..... *gillettei*, n. sp.
  BB. Vertex right angled, shorter than the pronotum. Elytra with numerous fine reticulations ..... *reticulata*, Sign.

Draeculacephala mollipes Say. Pl. VII, Fig. 1.

Tettigonia mollipes, Say. Jour. Acad. Nat. Sc. Phila. VI., p. 312, 1831.
Tettigonia innotata, Walk. Homop. III, p. 770, 1851.
Tettigonia antica, Walk. Homop. III, p. 771, 1851.

Tettigonia producta, Walk. Homop. III, p. 772, 1851.
Tettigonia acuta, Walk. Homop. III, p. 773, 1851.
Acopris viridis. Prov. Nat. Can.. p. 352, 1872.
Diedrocephala mollipes, Osb. & Ball. Ia. Acad. Sc. IV, p. 176, 1897.
Tettigonia mollipes. Fowl. Bio. Homop. II, p. 273, Pl. 18, Fig. 15, 1900.
Aulacizes lineata, Fitch, MSS.

Bright green. Vertex pale yellow, narrowly lined with black, acutely triangular, longer than the pronotum. Length, ♀ 7.5 mm., ♂ 6 mm.; width, 1.5 mm.

Vertex acutely angular, produced, disc flat or concave, margin straight, somewhat variable in length, always distinctly longer than the pronotum, in the female, slightly longer or almost equaling it in the male. Face long, retreating in an acute angle, in profile straight to the clypeus which is transversely inflated and angled slightly with the front. Elytra long, coarsely reticulate from apex back to the forking of the outer branch of the first sector, nervures raised, distinct.

Color; vertex, straw yellow, eyes, ocelli, a median line, a pair of posteriorly divergent lines on the disc, three concentric arcs on reflexed portion of front on each side and a pair of dots at apex, fuscous. Anterior part of pronotum and scutellum pale green to yellow, disc of pronotum and elytra bright grass green, nervures pale green, costal and apical margins light. Face pale yellow, sometimes washed with fuscous, about nine pairs of brown arcs on sides of front. Legs and below pale yellow, sometimes washed with fuscous or brown, especially in the male, a black line running back beneath the eyes on either side above which the brown or fuscous never extends.

Genitalia; female segment with the posterior margin truncate, the middle half obtusely, angularly produced. Male valve short and broad, rounding, plates long acutely pointed, half longer than the ultimate segment, the margins with a few weak hairs.

Specimens of this widely distributed and variable species are at hand from Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Ontario, New York, Maryland, District of Columbia, Virginia, Kentucky, Ohio, Illinois, Michigan, Tennessee, Florida, Mississippi, Texas, Minnesota, Iowa, Missouri, Nebraska, Kansas, Wyoming Colorado, New Mexico, Arizona, Vancouvers Island, California, Cuba, and various places in Mexico as far south as Vera Cruz, and the Biologia reports it from Central America, and Walker's *innotata*, the identification of which is in doubt, was from Brazil.

Var 7-guttata, Walk. Plate VII, Fig. 2.

Tettigonia guttata, Walk. Homop. III, p. 773, 1851

Similar to typical *mollipes* in form and structure, a black spot on the disc of vertex, a pair at the base, another pair just inside the basal angles of the scutellum, and sometimes a third pair on the pronotum.

Specimens of this variety are at hand from Florida, Mississippi and Mexico. Signoret considered this a distinct species and described it as with a longer head than *mollipes*. There is nothing in Walker's description to indicate this, and the spots on vertex and scutellum are about equally common in Var. *minor*. Many specimens of typical *mollipes* possess the spots on vertex at the base in the form of oblique lines, and some of them have trace of fuscous on the disc in place of the spot there.

VAR MINOR, WALK. Plate VII, Fig. 3.

Tettigonia minor, Walk. Homop. III p. 772, 1851.

Form and structure of typical *mollipes*, nearly, shorter and more robust. Vertex shorter, especially in the males, where it is shorter than the pronotum and with a strongly depressed disc. Length, ♀ 6.7 mm., ♂ 5 mm.

Color; bright green, the anterior part of pronotum and vertex pale yellow, often washed with green. The males usually have the frontal sutures, ocelli, and tip of vertex, dark, and any or all of the spots of the preceding variety may be present. Face and below from smoky brown in the females to black in some of the males.

Specimens that have been referred to this variety are at hand from Florida, Mississippi, Texas, Arizonia, California, and Mexico, and forms intermediate in structure, but with the black face from points as far north as New York. This is the commonest form in the Southern states along the Gulf, and in California and Mexico, while on the other hand the females from Vancouvers Island and Cuba have the longest heads seen.

DRAECULACEPHALA ANGULIFERA WALK. Plate VII, Fig. 4,

Tettigonia angulifera, Walk. Homop. III, p. 771, 1851.

Form and color of *mollipes*, nearly, much larger with a broader, shorter, heavier lined vertex. Length of ♀ 10-11 mm., ♂ 8 mm.; width, 2.5 mm.

Vertex broad, slightly sloping from the elevated pronotum, disc concave in front, the lateral margins straight, length slightly less

than the basal width or the length of the pronotum. Face in profile straight, deeper than in *mollipes*, clypeus larger and more strongly angled. Pronotum broad, side margins long. Elytra strong, venation as in *mollipes*.

Color; as in *mollipes*. Pronotum and elytra deeper green, the nervures paler. Lines on vertex broad and distinct, black lined, extending back of the eye and margining the reflexed portion of front half way to the apex, a line along the margin from the suture to the eye, curving in to form a spot on the disc inside the eye. Face pale yellow, about nine short arcs on the sides of front, a spot on genae and a dot on the outside the lorae, black. Below usually pale, a line running back from under the eye black, sometimes all below this line clouded with fuscous.

Genitalia; female segment with the posterior margin rounding, the apex slightly, angularly produced, pygofers long and narrow.

Male, ultimate segment longer than wide, cylindrical, from the open end of which appears a semi-circular valve and a pair of long, strong, slightly, divergent, pincer-like plates, longer than the long ultimate segment, their tips curving upwards and inwards.

Specimens have been examined from New York, Pennsylvania, Ohio and Iowa and Walker described it from New Foundland, and it has been reported from Canada and Kansas. The strikingly large size, especially of the female, will at once separate this species. The male genitalia is also very distinct.

DRAECULACEPHALA MANITOBIANA N. SP. Plate VII, Fig. 5.

Form of *novaeboracensis* nearly, with a longer head, as long as in *angulifera*, but much narrower. Color as in the latter species, the males often with a black wedge and a pair of ovals on disc of vertex. Length, ♀ 8-9 mm., ♂ 7-8 mm.; width, 2 mm.

Vertex one-fourth longer than the pronotum, as long as its basal width, disc flat the margins thick, slightly but distinctly rounding. Face moderately deep, profile convex or slightly angled before the clypeus, which is gibbous and gives a second angle to the profile. Pronotum small, elytra and venation as in *mollipes*.

Color; deep green as in *angulifera*; vertex washed with green. Female with a light band around the broad margin of the vertex; inside of this on either side are five concentric lines, the rest of the markings as in *angulifera*. Spots at the apex rather large, separated by an elongate ivory white mark. Front with ten pairs of rather long arcs and a median line fuscous, a black mark above the antennae and a dot outside the lorae. The male has a large triangular spot behind the apex of vertex and the broadened lines on the disc, black, the lines often becoming confluent and forming an

oval around each ocellus, which is connected in front with the posterior angle of the triangle. Pronotum and elytra as in *angulifera*, much deeper green than in *novaeboracensis*, a black spot just under the margin of pronotum back of the eye.

Genitalia; female segment nearly truncate posteriorily with a triangular median production as in *mollipes*. Male ultimate segment nearly square, valve broad, obtusely triangular, plates thick, slightly divergent, roundingly triangular, their apices attenuate, curved up. Pygofers longer than the plates, keel shaped from below.

Described from eleven examples from Happy Hollow, North Park and Gunnison, Col., and a pair from Winnepeg, Manitoba. The longer head and heavier marking will at once separate this from *novaeboracensis*, to which it is allied structurally.

DRAECULACEPHALA NOVAEBORACENSIS Fitch., Pl. VII, Fig. 6.

Aulacizes novaeboracensis, Fitch. Homop. N. Y. St. Cab. p. 56, 1851.
Tettigonia prasina Walk. Homop. III, p. 768, 1851.
Diedrocephala mollipes Prov. Pet. Faune Ent. Can. III, p. 266, 1889.
Diedrocephala novaeboracensis, Osb. & Ball. Ia. Acad. Sc. IV, p. 177, 1897.

Form of *manitobiana* head broader and shorter, wider than pronotum, a pair of black spots at apex and another pair against the eyes in front, the rest of the lines pale brown. Length, 8 mm.; width, nearly 2 mm.

Vertex in the female equalling the pronotum in length, distinctly shorter than its basal width, slightly less than right angled disc flat or a trifle convex margins thick and slightly rounded to the blunt point. Profile of front very slightly convex, not at all angled below, extending onto the clypeus which is angled above the middle. Pronotum rather short, elytra as in *manitobiana*.

Color; pale green, vertex pale lemon yellow, a pair of large triangular spots at the apex, separated by an ivory line, a pair of quadrangular ones on the margins in front of the eyes, the ocelli, and sometimes the sutures, black, remainder of the lines brown, somewhat obscure. Face pale yellow, arcs on front brown or fuscous often obscure, a large black spot above antennal sockets, a spot on genae, a dot outside lorae on either side, and often a dot on disc of clypeus, black. Disc of pronotum and elytra pea green, a black dot behind the eye below the margin of pronotum.

Genitalia; Female segment roundingly emarginate posteriorly with an obtuse median tooth. Male, valve large roundingly pointed a third the length of the plates, plates thick, finger-like, bluntly pointed, a little longer than the ultimate segment, a little shorter than appressed pygofers.

Specimens are at hand from Vermont, New York, Ontario, Iowa, Nebraska, Colorado, Idaho and Vancouvers Island,

and it has been reported from Maryland and Hudson's Bay (*prasina*). In this species the vertex and anterior part of pronotum are pale yellow, the lines on vertex obscure while the spots are distinct, while in the preceding species the vertex and anterior part of pronotum are washed with greenish and the lines are all dark and distinct.

DRAECULACEPHALA FLORIDANA N. SP. Plate VI, Fig. 6.

Resembling *mollipes* in size and length of head, the vertex slightly longer. the margin thicker, the apex acute conical, upturned. Front and vertex mottled with brown. Length of male, 6.5-7 mm.

Vertex acute conical, the lateral margins thick, one-fourth longer than the pronotum, disc concave anteriorly, front in profile broadly convex, the clypeus small, in the same curve. Pronotum as in *mollipes*, elytra similar to *reticulata*, but with fewer reticulations.

Color; front and vertex mottled with light brown and pale, a minute polished dot of light at the apex slightly margined with dark brown, a light median line ending in an irregular spot in front of the middle, the inner margin of the ocelli broadly white, frontal sutures with black lines to the ocelli. Pronotum pale the disc, omitting a median line, green. Elytra green, the margins and nervures pale.

Genitalia; male, ultimate segment nearly square, valve almost concealed, plates a little longer than the segment, attenuately pointed.

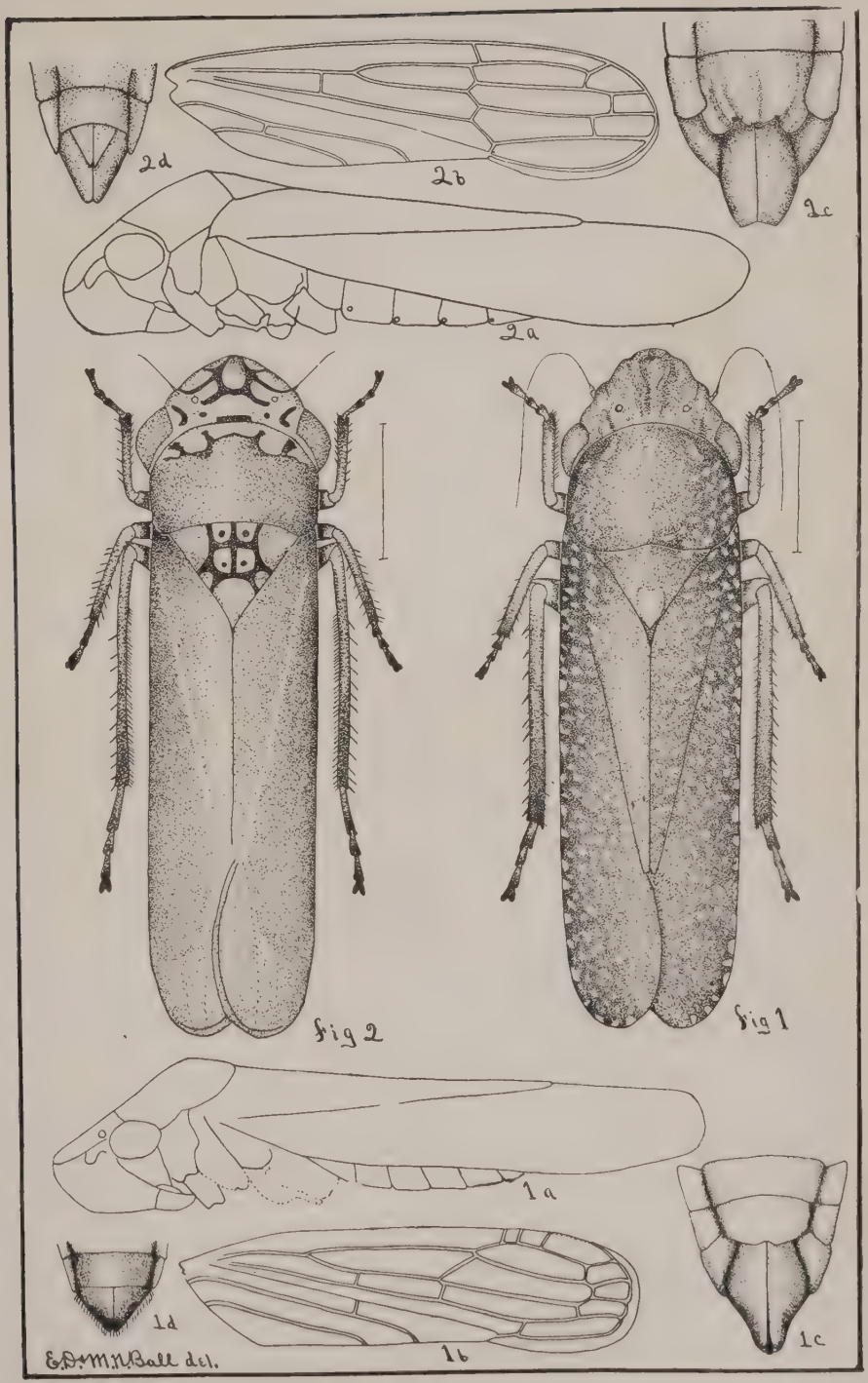
Described from two males from Charlotte Harbor, Florida, from the Iowa State College collection (Van. D. Coll.), through the kindness of Professor Summers.

The long, brown mottled, upturned vertex will at once distinguish this species.

DRAECULACEPHALA GILLETTEI N. SP. Plate VI, Fig. 7.

Intermediate in form and size between *floridana* and *reticulata*, somewhat stouter, vertex not quite as long as the pronotum. Color grayish cinereous, a dark wedge on vertex. Length, ♀ 6 mm., 5.25 ♂ mm.; width, 1.5 mm.

Vertex broad, slightly convex, apex blunt, not quite as long as the pronotum, lateral margins rounding to the convex front. Front in profile convex, lower part of clypeus rounding back from the curve of the front. Pronotum broad, slightly angularly emarginate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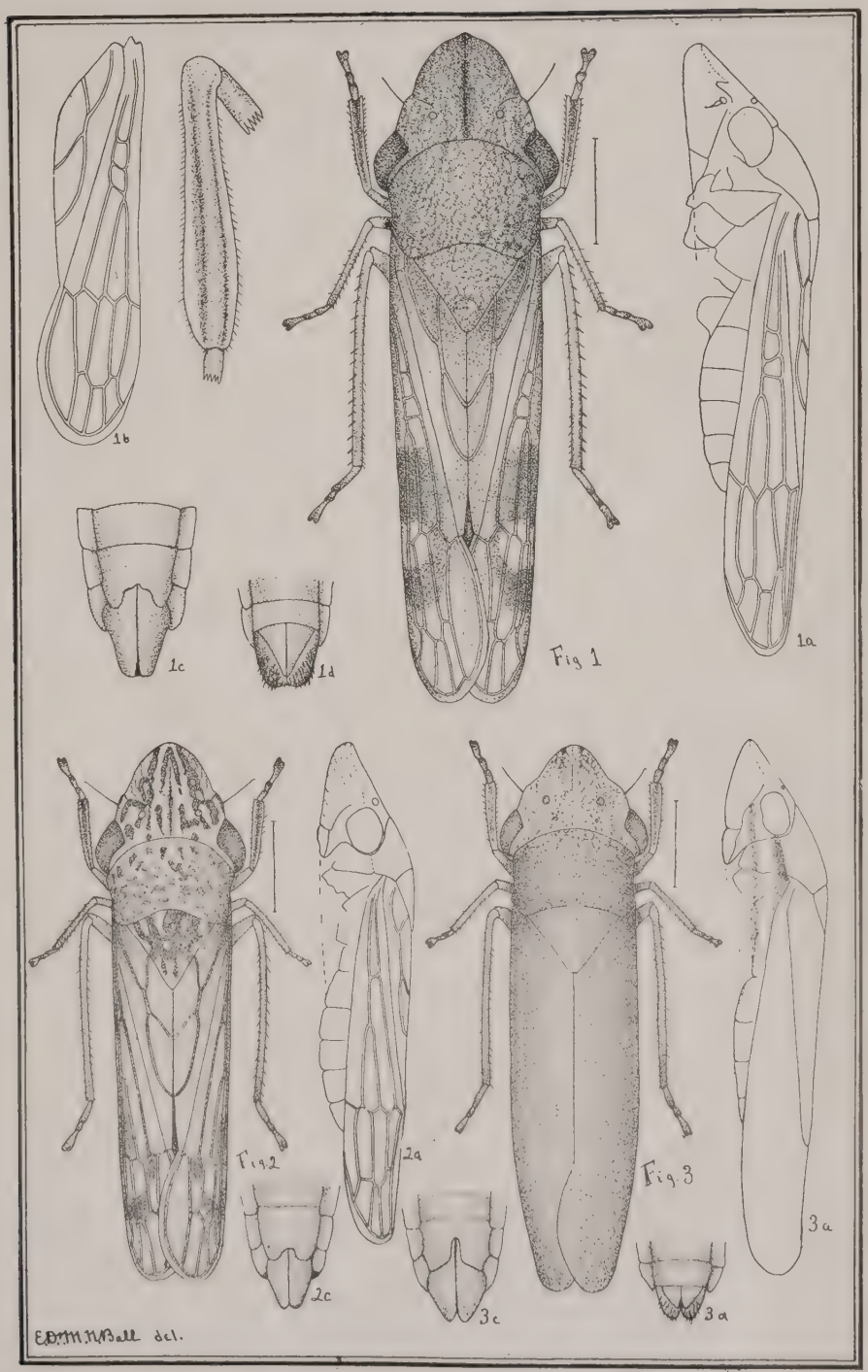
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in the middle posteriorly. Elytra rather broad, venation distinct, similar to that of *floridana;* female less reticulate.

Color; vertex and face pale yellow, finely irrorate with brown, the frontal sutures including the ocelli, a basal median line and an irregular wedge on anterior half, fuscous. Pronotum olive grayish, a row of submarginal creamy spots sometimes extending back onto the disc as pale lines. Scutellum pale impressed line, spots inside basal angles and a pair on anterior disc, dark. Elytra cinereous or sometimes greenish, nervures pale. The male sometimes darkened up to a slaty brown. Below pale, margins of abdomen often red.

Genitalia; female segment half longer than the penultimate, posterior margin nearly truncate, a somewhat variable obtuse, median tooth. Male valve almost concealed, plates stout, coriaceous, scarcely longer than the ultimate segment, their apices bluntly pointed, upturned, whole genitalia reddish.

Described from eighteen specimens from La Salle and Fort Collins, Col. The first specimens were collected by Professor Gillette.

DRAECULACEPHALA RETICULATA SIGN. Plate VI, Fig. 8.

Tettigonia reticulata, Sign. An. Ent. Soc. Fr., p. 22, Pl. 2, Fig. 10, 1854.
Diedrocephala flaviceps, Riley. Amer. Ent. III, p. 78, 1880.
Tettigonia diducta, Fowl. Bio. Homop II, p. 274, Pl. 18, Fig. 17, 1900.
Helachara fulvicephala, Fitch MSS.

Small, moderately stout, vertex blunt, shorter than pronotum. Elytra densely reticulated before the apex. Green with the head pale, washed with reddish. Length, ♀ 5.5 mm., ♂ 4-5 mm.

Vertex bluntly conical, nearly right angled, two-thirds the length of the pronotum, ocelli large. Face in profile convex. The clypeus slightly elevated, front broad rounding with the vertex. Pronotum rather long, strongly emarginate on the median third posteriorly. Elytra as in *mollipes*, but with the reticulations more numerous, much more numerous than in the two preceding species.

Color; vertex and face pale, finely irrorate with brown and washed with reddish orange, a pair of spots against the ocelli on the inside and a marginal line sometimes emphasized in the spots at the apex, creamy; ocelli shining black; anterior margin of pronotum and the scutellum pale yellow; disc of pronotum and elytra green or grayish green; nervures and margin pale, distinct. Legs and below pale yellow, margins of the abdominal sternites in the female reddish.

Genitalia; female segment half longer than the penultimate, posterior margin truncate, the median half roundingly produced. Male valve short, nearly as wide as the plates at base, plates long, acutely triangular, slightly longer than the ultimate segment.

Specimens are at hand from South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, California, and Mexico, and it was described from Cuba.

Signoret's description is very good, and fits our species in every particular except that he gives the length as 3 mm.; this would be too small, but the length line on the plate is fully 4 mm., which would fit the males of this species, and they also more often possess the "three white points at the apex," which he describes.

EXPLANATION OF PLATES.

The figures on a plate, except where otherwise noted, are drawn to the same scale.

The drawings were made by my wife from my pencil sketches and under constant supervision as regards structural accuracy.

PLATE I.

Fig. 1.—*Aulacizes irrorata*. Female, typical form.
a, profile; *b*, elytron; *c*, ♀ genitalia; *d*, ♂ genitalia.

Fig. 2.—*Oncometopia undata*. Female, typical form.
a, profile; *b*, elytron; *c*, ♀ genitalia; *d*, ♂ genitalia.

PLATE II.

Fig. 1.—*Homalodisca triquetara*. Female, typical.
a, profile; *b*, elytron; *c*, ♀ genitalia; *d*, ♂ genitalia.

Fig. 2.—*Homalodisca liturata*. Female.
a, profile; *b*, elytron; *c*, ♀ genitalia.

Fig. 3.—Head and etc., of *Homalodisca insolita*. Female.
a, profile; *c*, ♀ genitalia; *d*, ♂ genitalia.

PLATE III.

Fig. 1.—*Tettigonia hieroglyphica*. Typical form from Iowa.
a, profile; *b*, elytron; *c*, ♀ genitalia; *d*, ♂ genitalia.

Fig. 2.—Variety *dolobrata* from Iowa.

Fig. 3.—Head, etc., of variety *uhleri* from Col.
k, variety *uhleri* from Washington showing long elytra.

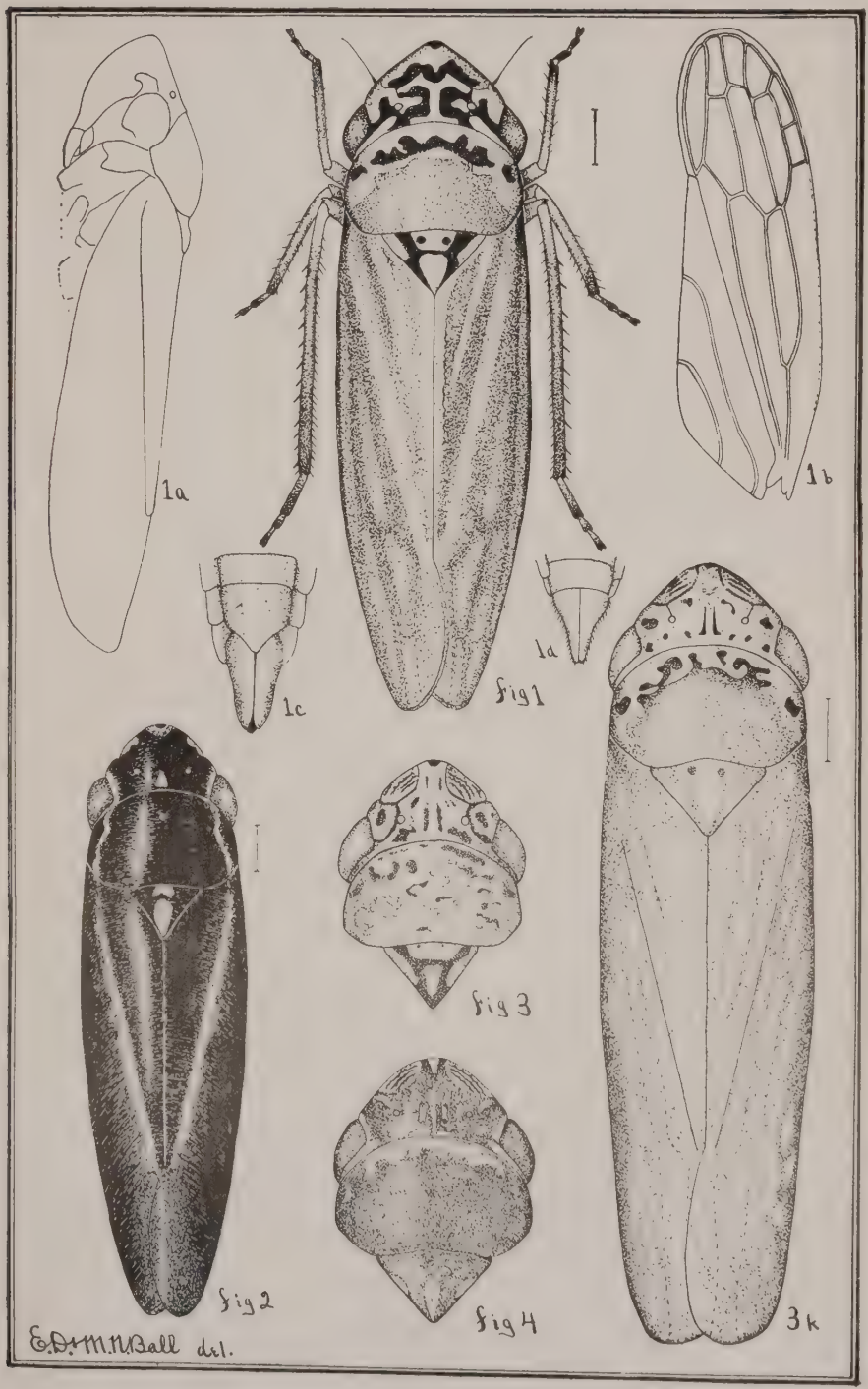
Fig. 4.—Head, etc., of variety *confluens* from Washington.

PLATE IV.

Fig. 1.—*Tettigonia gothica*. Typical markings.
a, profile; *b*, elytron; *c*, ♀ genitalia; *d*, ♂ genitalia; *e*, face; *k*, head, etc., of same with light markings.

Fig. 2.—Head, etc., of *Tettigonia atropunctata* from California.
c, ♀ genitalia; *d*, ♂ genitalia.

Fig. 3—Head, etc , of *Tettigonia dohrni* from Arizona.
c, ♀ genitalia; *d*, ♂ genitalia.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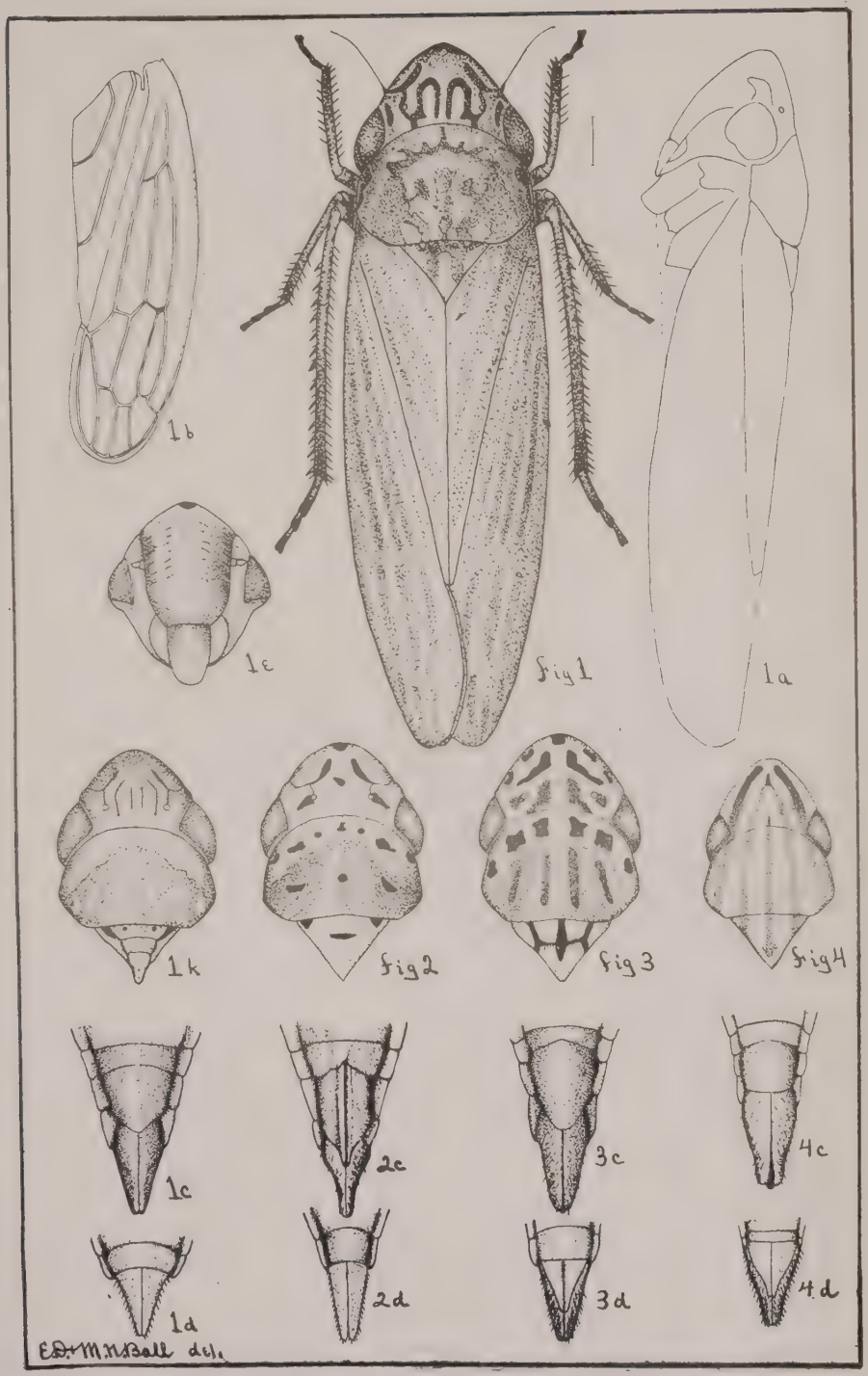
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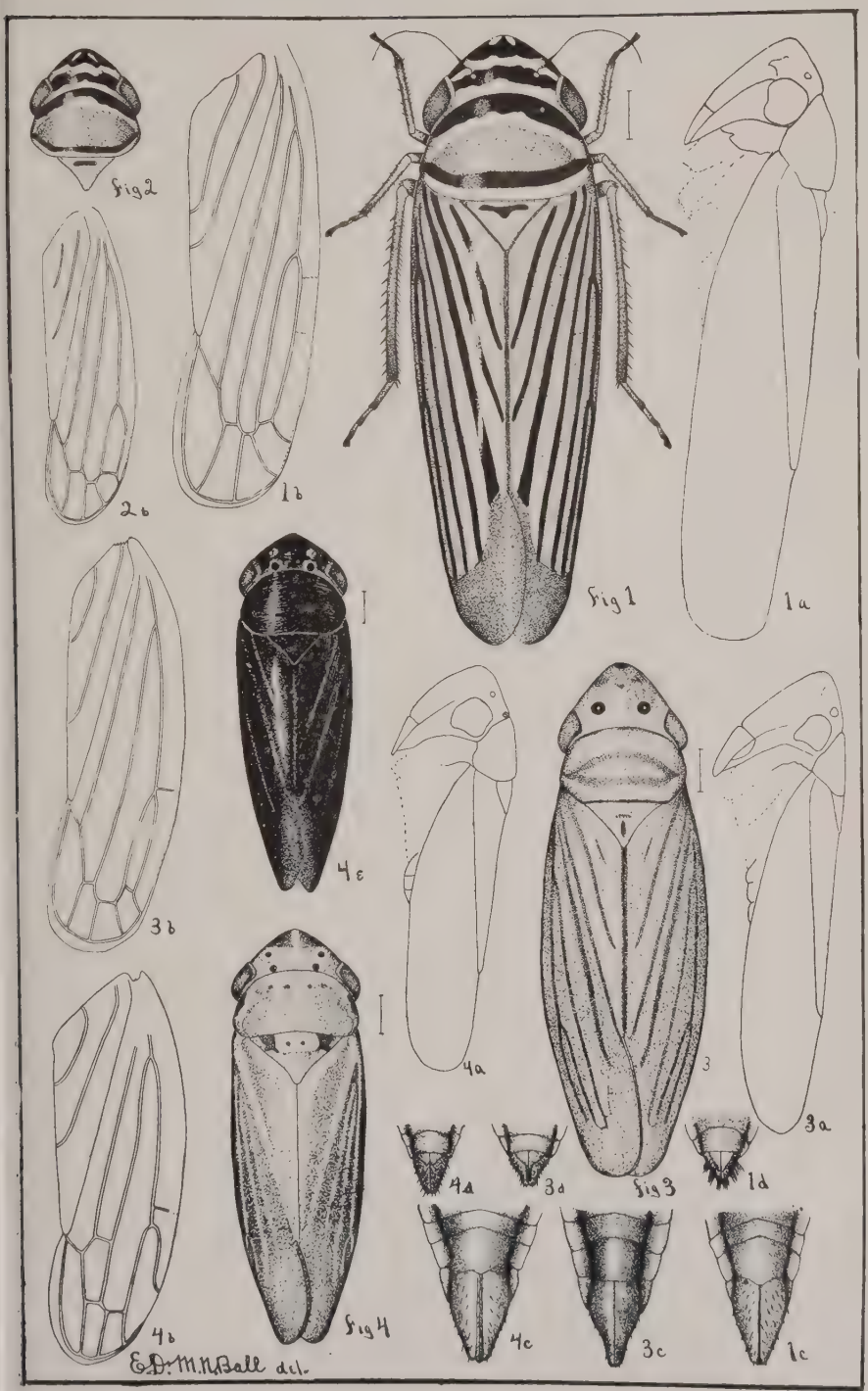
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Fig. 4.—Head, etc., of *Tettigonia occatoria* from Mississippi.

The figures on the lower half of the plate are drawn to a smaller scale than those on the upper.

PLATE V.

Fig. 1.—*Tettigonia bifida.* Female.
a, profile; *b*, elytron; *c*, ♀ genitalia; *d*, ♂ genitalia.

Fig. 2.—Head, etc., of *Tettigonia geometrica.*
b, elytron.

Fig. 3.—*Tettigonia tripunctata.*
a, profile; *b*, elytron; *c*, ♀ genitalia; *d*, ♂ genitalia.

Fig. 4.—*Tettigonia hartii.* Female from Ohio.
a, profile; *b*, elytron; *c*, ♀ genitalia; *d*, ♂ genitalia.

e, Male of same from Ohio.

PLATE VI.

Fig. 1—Head, etc., of *Helochara communis.*
a, profile; *c*, ♀ genitalia; *d*, ♂ genitalia; *e*, antenna (enlarged).

Fig. 2.—Head, etc., of *Diedrocephala coccinea.*
a, profile; *b*, elytron (reduced); *c*, ♀ genitalia; *d*, ♂ genitalia.

Fig. 3.—Head, etc., of *Diedrocephala versuta.* Typical form from Tennessee.

Fig. 4.—Head, etc., of *D. versuta*, var. *lineiceps* from Texas.

Fig. 5.—Head, etc., of *D. versuta*, var. *cythura* from California.

Fig. 6.—Head, etc., of *Draeculacephala floridana* from Florida.
d, ♂ genitalia.

Fig. 7.—*Draeculacephala gillettei.* Female, Colorado.
a, profile; *b*, elytron; *c*, ♀ genitalia; *d*, ♂ genitalia.

Fig. 8.—Head, etc., of *Draeculacephala reticulata.*
d, ♂ genitalia.

PLATE VII.

Fig. 1.—Head, etc., of *Draeculacephala mollipes.* Female from Iowa.
a, profile; *b*, elytron; *c*, ♀ genitalia; *d*, ♂ genitalia.

k, Head, etc., of male of same.

Fig. 2.—Head, etc., of *D. mollipes*, var. *7-guttata.* Female from Florida.
k, Head, etc., of male of same from Mississippi.

Fig. 3.—Head, etc., of *D. mollipes*, var. *minor.* Female from California.
k, Head, etc., of male of same from Mexico.

Fig. 4.—Head, etc., of *Draeculacephala angulifera.* Female from Iowa.
a, profile; *d*, ♂ genitalia.

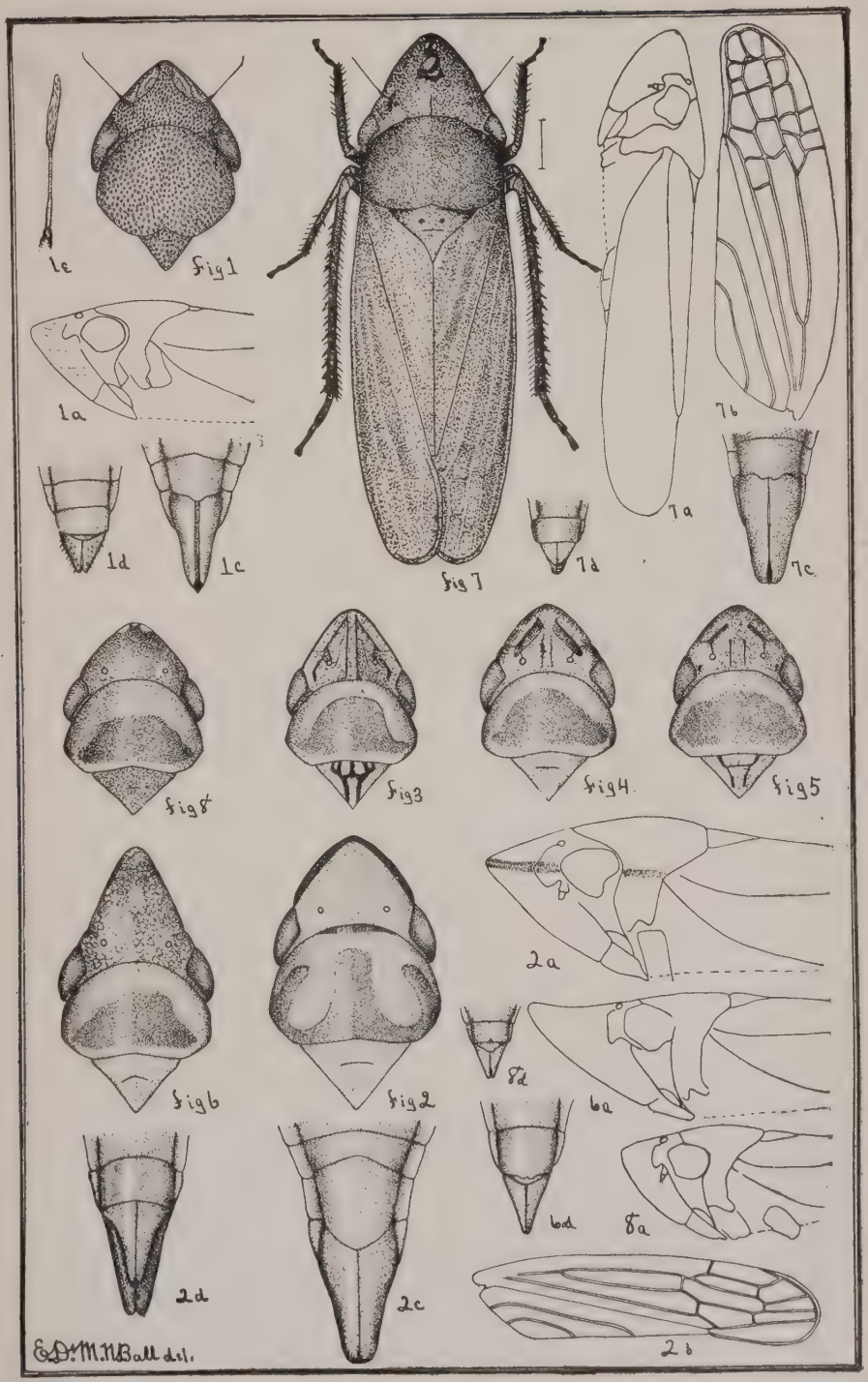
k, Head, etc., of male of same from Iowa.

Fig. 5.—Head, etc., of *Draeculacephala manitobiana,* Female from Colo.
a, profile; *d*, ♂ genitalia.

k, Head, etc., of male of same from Colorado.

Fig. 6.—Head, etc., of *Draeculacephala novaeboracensis.* Female from Iowa
a, profile; *d*, ♂ genitalia.

k, Head, etc., of male of same from Iowa.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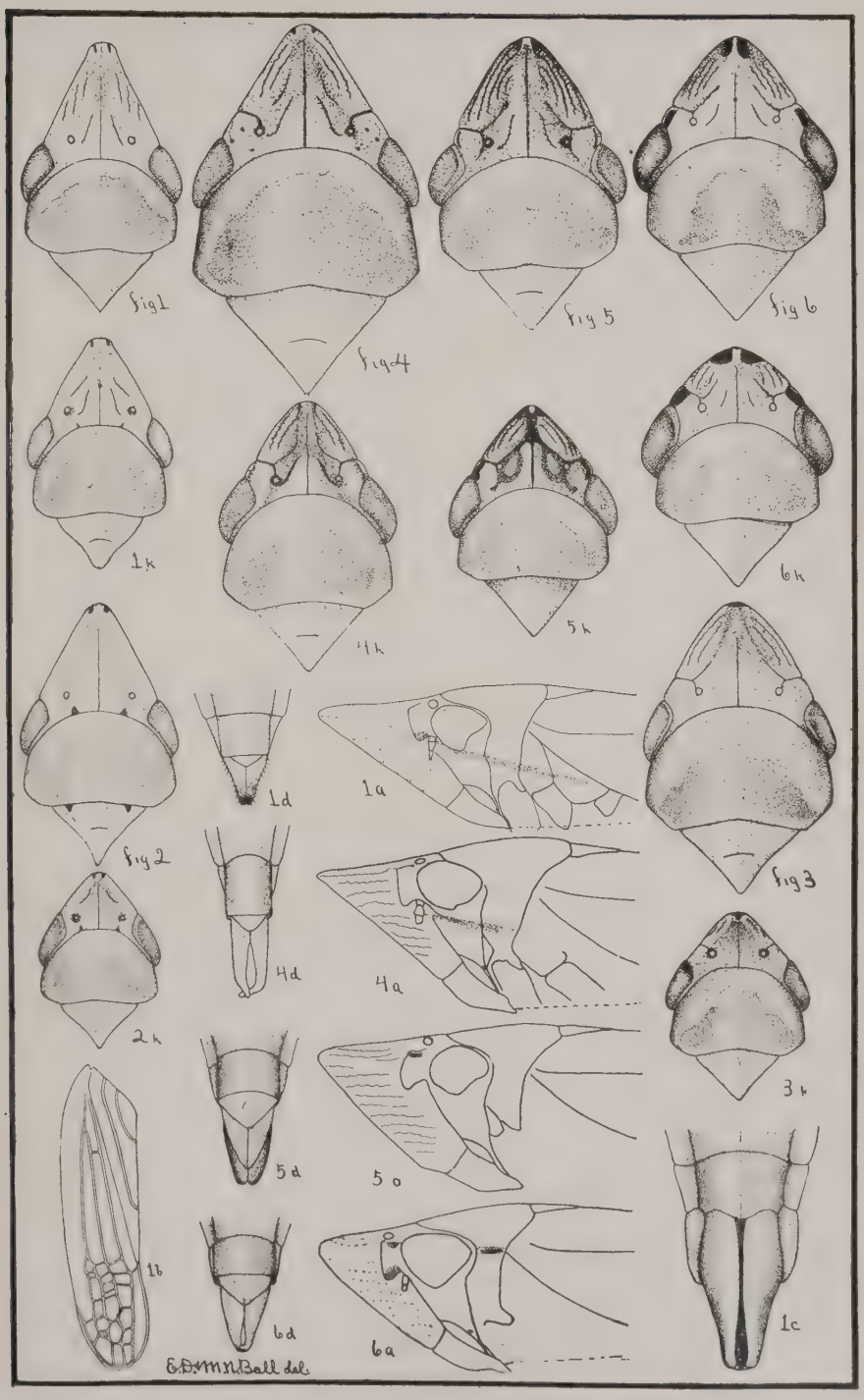
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